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JOURNAL

OF THE

ROYAL

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STATISTICAL SOCIETY.

(Founded 1834.)

INCORPORATED BY ROYAL CHARTER 1887.

VOL. LXXIV.—YEAR 1910-11.

(NEW SERIES.)

122310
10/5/12

LONDON:
THE ROYAL STATISTICAL SOCIETY
9, ADELPHI TERRACE, STRAND, W.C.

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JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

DECEMBER, 1910.

A Statistical Survey *of the* Problems *of* Pauperism.

The Presidential Address *of the* Right Hon. Lord George Hamilton, G.C.S.I. Delivered *before the* Royal Statistical Society, November 15, 1910.

At the outset of my Address I must acknowledge the honour done to me by the Council of this most distinguished Society in electing me as their President for the forthcoming Session. I highly appreciate the compliment, for although I have for many years been a member of the Society, and derived much useful information from its publications, I have not been able to take an active part in its proceedings. For the ensuing year I will make what amends I can for my past inactivity.

I must now note the incidents of the past year as far as they affect the fortunes of the Society.

By the lamented death of H.M. King Edward VII we lost our Patron, and H.M. King George has graciously consented to continue the Royal Patronage. His Majesty for nine years has been an Honorary President of the Society, and in that capacity in 1905 he delivered a most encouraging and thoughtful address at the reception of the International Statistical Institute. We are thankful to think that we have for the future the benefit of the encouraging patronage of a Sovereign who personally appreciates the value of statistics.

The Society has to deplore the deaths, since June of last year, of the following Honorary Fellows: Monsieur J. J. Emile Cheysson (France), Dr. Franz Ritter von Juraschek (Austria), Monsieur N. G. Pierson (Netherlands), and Mr. William Henry Archer, K.C.P., K.S.G. (Victoria). We have also lost by death 19 English Fellows, including that most distinguished and practical statistician, Sir Robert Giffen. Sir Robert's work was wide, varied and continuous. He was of great assistance to successive Governments in helping them in the preparation of their Bills. His general knowledge, unfailing accuracy, and the love he had for the science of statistics, made him a model of activity and experience. He has shown his interest in the Society he so long elevated and adorned by giving it a residuary interest in his estate.

In the past year the work of the Census Committee has been continued upon the lines laid down since its appointment in 1907. It is noteworthy that among other changes in the schedule of the Census (Great Britain) Bill, 1910, a return is required, in the case of married persons, of the duration of the marriage, and the number of children thereof born and surviving, and also that the number of rooms inhabited must in all cases be stated. Both these requirements were recommended in the Report of the Census Committee (Section A, Parts I and II).

The Report of the Special (Housing and Development) Committee was adopted by the Council on July 15, 1909, and as a result of its recommendations the following changes have been made:—

(1.) A new lease has been obtained of the Society's present premises for a period of twenty-one years.

(2.) From the commencement of the present year, the Journal has been published monthly during the Session, and not, as formerly, quarterly during the calendar year. In connection with its more frequent issue the Council are endeavouring to extend the scope and increase the usefulness of the Journal, and a new feature has been introduced by the inclusion in each number of current notes on statistical subjects. The number of monthly issues, which appear on or about the 15th of each month, is eight, although during the past Session not more than seven have appeared in all, since the first volume of the new series began with the January number. The first number of the second volume will appear in December.

(3.) A thorough redecoration and re-arrangement of the Society's house has been carried out. The Library, Reading Room, and other rooms have been made more convenient for the use of Fellows, and it is hoped that the Society's house will be more generally resorted to by them in the future than in the past.

(4.) The Society's Rooms and Library have remained open during the Session until 7 p.m. on week days, and 2 p.m. on Saturdays. So far the use made of the Library by Fellows during the extended hours has not been large, but it is expected that it will increase as the facilities become better known.

The roll of Fellows at the end of last year was 825, as compared with 906 as the average of the ten preceding years. This is partly due to an exceptional number of deaths amongst the Fellows and partly due to fewer entrants. In one sense, I am not surprised at this falling-off, for we live in an age of emotion and sympathy; and these qualities, admirable as they are in themselves, are rather apt to shy when brought into contact with irrefutable arrays of facts and figures. Statistical accuracy is, however, the foundation of sound social legislation; enthusiasm and sympathy the driving-power by which such legislation is carried. We are, undoubtedly, approaching an epoch of very difficult social legislation, and no one who wishes to promote such legislation on sound lines, whether he be in Parliament or outside, can do better than join a Society which has an almost inexhaustible supply of facts and figures at its disposal bearing upon the social problems to be discussed in the near future.

As President for the incoming year, it is my duty to open the statistical session by an address. It seemed to me that I could best perform that duty if I could take as a subject one with which I was myself personally familiar, which was closely connected with the urgent social and political questions of the day, and which, though of national importance, was not in any sense a subject of party contention.

A statistical survey of poor law problems seem to me to fulfil all these conditions. The tables and figures which I am about to put before you form part of the report of the Royal Commission upon Poor Law. They were accepted by all who were on that Commission, but they have been so buried in that vast report that neither the public nor even experts have given to them the attention they deserve. I must, therefore, at the outset, acknowledge my obligations to those who personally compiled these figures for the Commission and me, notably Mr. Craven, the statistical secretary of that body, and I will use these figures in the same broad sense in which they were collected and compiled, not to establish any partisan or preconceived conclusions, but to lay before the public, in a manner which cannot be controverted or ignored, the gravity and magnitude of the pauperism of this country.

Before I come to figures I wish to lay down certain statistical propositions, the soundness of which seems to me to be indisputable, especially when dealing with the social problems of Great Britain.

We periodically, as a nation, review and take stock of our moral and material progress. We boast that, decade by decade, we are improving in enterprise, education, thrift, organisation of charity, in national and local hygiene, in science and industrial methods. I readily admit that great advance has been made in these respects, and that during the last forty years the recorded improvement in each of these spheres of action has been marked.

I take the period of forty years back as the commencement of a special epoch, for it was then that the system of national education was established, and sanitary hygienic measures made, by Act of Parliament, a primary duty of the local authority. These measures should have resulted in a wider and more beneficial distribution of wealth, and in the reduction of destitution. For purposes of contrast, to take a year antecedent to this period of improvement and development and to compare the number of paupers, say in 1850 or 1860, with those in 1910, is to apply a misleading test. The social conditions of the two periods are so widely different, and the forces of ameliorative reform and work have been so expanded, that any comparison between the two periods, without taking these differences into consideration, is quite delusive. It was firmly believed by those who advocated a vast annual expenditure upon education and sanitation that such expenditure would tend to dry up the sources of destitution by promoting knowledge, hygiene, and health.

If a great river perennially overflows its banks, and, to avert the destitution and misery caused by such floods, a heavy expenditure is incurred in raising its banks and providing it with sluices and dams, and if those entrusted with the control and conduct of this machinery annually glorify the success of their work, a comparison of the damage done subsequently to the establishment of these works with that which occurred previous to their erection would be wholly misleading unless full allowance were made for the material change in the conditions. A bald statistical comparison between the amount of pauperism in existence in 1910 and that of the pre-educational, scientific, and sanitary epoch would be absolutely misleading, unless full allowance were made for the widely different circumstances of the two periods, yet, curiously enough, the apologists of the present poor law system have recourse to this fallacious statistical method for the vindication of their attitude.

I lay down as a statistical maxim that 1871, the date of our Education Acts and other remedial measures, is the outside limit of the period within which it is justifiable to draw statistical data for comparison with the existing state of things.

In the next place, I contend it is not enough to say that in recent years there has been a reduction of pauperism in the ratio per thousand. Such reductions are caused, not by diminution of the actual amount of pauperism, but by growth of population. To show real improvement there should be a reduction in the actual number of paupers.

I further assert that an actual reduction in numbers, even if it can be shown, is not in itself satisfactory if it can be proved to be entirely due to a diminution in the number of children and women in receipt of relief, which more than counterbalances the increase in male adult pauperism. An increase in male adult pauperism is a bad sign, for it is an indication of moral decline and virile degeneracy or of increasing difficulty in obtaining employment.

Let us now turn to actual figures, and see how far they confirm and how far they upset these elementary propositions.

Three sets of figures.

I ask you to concentrate your attention on three different sets of figures.

First, there is the half-yearly return of paupers which is officially published by the Local Government Board. The dates selected are January 1 and July 1. These dates are taken because in January pauperism is on the upward grade, though it does not reach its *maximum* until the end of February. July, on the other hand, is the month in which pauperism is at its lowest ebb. It is thus assumed that the mean of these two half-yearly counts gives an adequate record of the number for the whole year:—

	July 1, 1907.	January 1, 1908.
Casual paupers	11,408	17,083
All other classes of paupers	745,794	798,898
Total*	757,202	815,981

* This does not include insane paupers in asylums, workhouses, &c., and in receipt of out-door relief.

Though a good deal of information in detail is given with this return, the Poor Law Commission were anxious to obtain more thorough information concerning the condition, age, and occupation of the pauper population, and we, therefore, asked the Local Government Board to be good enough to obtain a pauper census through the Guardians, this census to be much on the same lines as the census returns obtained in connection with the ordinary population. The main details we asked for were:—

1. Ages.
2. Classification as to physical conditions, cause of seeking relief.
3. Sex classification.
4. The institutions in which in-door paupers were relieved, and the method of relief in case of out-door paupers.
5. Occupation of adults.

The date selected for the census was March 31, 1906. This date was chosen because it coincided approximately with the month and day selected for the general census, and because it marks the close of the financial year.

I must here repeat my acknowledgment to the clerks of the various Boards of Guardians who took a part in preparing this most laborious return, which gave us a number of most valuable data, the most important of which I propose to use to-day.

The result of this census return was that on March 31, 1906, there were, excluding lunatics in asylums, registered hospitals, and licensed houses, 827,939 paupers. These figures approximate to those given in a previous set of figures, though they belong to the preceding year; they are somewhat more, as pauperism was then on the downward grade.

The Commission were not satisfied that these figures revealed the full number of those who, in the course of the year, obtained relief from the Guardians. We, therefore, asked for a year count, that is to say, an enumeration of all the persons who have had recourse to the Poor Law during the year. We obtained this return, and the result was somewhat startling. The total number of those who had been so relieved by the Guardians was 1,709,436, or 2·5 times greater than the mean of the number relieved on January 1, 1907, and July 1, 1907. The ratio of pauperism to the population in England and Wales during the year 1907 became under this estimate 47·7 per thousand, as against 22·7 per thousand as shown by the day counts for the same year.

Proportion of sexes relieved.

Having got this huge figure to deal with, our next object was to ascertain the proportion of sexes relieved. Taking the day count of January, 1908, nearly half of those in receipt of relief were women:—

	Number.	Per cent. of total number of persons relieved.	Per 1,000 of estimated population in each group.
Men........................	221,022	27·6	19·8
Women	343,825	43·0	27·8
Children under 16	234,792	29·4	20·6
Total	798,898*	100·0	22·9

When we come to the year count, the excess of women relieved during the course of the year would not appear to be so great as it is from the day count:—

	Year's count.	Mean of two day counts of 1907.	Ratio of year's count to day count.	Ratio of year's count to estimated population in middle of year.
				Per 1,000.
Men	526,449	217,210	2·42	47·2
Women	618,673	350,308	1·77	50·0
Children under 16	564,314	226,674	2·49	49·4
Total	1,709,436	793,519*	2·15	49·5

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* Deducting persons who are counted twice by reason of being reckoned, for various reasons, both as in-door and out-door paupers.

You will see that the year count for women was only 1·77 times greater than the day count, whereas the day count for men was 2·42 times greater than the year count, consequently the rate of pauperism for women was, in the year count, only slightly in excess of the rate for men. It is, therefore, quite clear that the average duration of relief amongst women is longer than amongst men.

Now the causes of the higher rate of pauperism amongst women as against men can readily be ascertained. In the first place, there is the case of young widows with families who cannot support both themselves and their families. In the second place, there is the case of women who become widows in an advanced period of life and are incapable of maintaining themselves. It must, further, be borne in mind that when a man dies, the bread-winner or occupation on which the family depended goes. This is not usually the case as regards a widower though I am sorry to say that, in certain parts of England and Wales, women are more and more becoming the wage-earners in a family.

Classification by age.

I now turn to the classification of pauperism by age, and the pauper census of March 31, 1906, gives the following table:—

Age-groups.	Number of persons relieved (not including lunatics in asylums, &c., or casuals).	Per 1,000 of estimated population at same ages.
Under 5 years	51,767	13·6
5 years and under 15 years	179,854	26·0
15 ,, 25 ,,	22,583	3·3
25 ,, 35 ,,	38,189	6·6
35 ,, 45 ,,	58,401	13·3
45 ,, 55 ,,	56,252	17·9
55 ,, 65 ,,	91,530	43·3
65 ,, 75 ,,	183,125	163·0
75 ,, 85 ,,	117,231	275·9
85 years and upwards	18,080	353·1
Total number of persons relieved and rate per 1,000 of estimated population	817,012	23·6

Dealing with this table it will be understood that, so far as adults are concerned, the number of persons living at each group diminishes with advancing years, and the number of persons relieved increases at each group up to the age of 75. The only exception to this rule is that in the age-group 45 to 55, and it is found that there is a large decrease almost entirely amongst women and a large proportion of this decrease is composed of able-bodied widows. It would, therefore, seem that at this age widows became self-supporting or that their children have reached an age when the presence of the mother in the house is no longer essential, or the children are beginning to earn and can contribute towards the maintenance of their mothers. Taking the whole population of the country, there is an excess of women over men of about a million, but the excess of women paupers over male paupers exceeds that proportion here in every age-group.

In-door and out-door relief.

There are two authorised methods of relief which are known as in-door and out-door relief. The rising generation like lengthy terminology and these two methods are now characterised as institutional relief and domiciliary aliment; I shall adhere to the simpler and old-fashioned expressions.

The number and proportion of in-door and out-door paupers on January 1, 1908, that is taking the day count, and for the year ended September 30, 1907, that is the year count, are as follows:—

	In-door relief.	Out-door relief.	Total.
Day count — Persons relieved on January 1, 1908—			
Number	252,618	547,021	798,898
Proportion	31·6	68·4	100·0
Year's count — Persons relieved during year ended September 30, 1907—			
Number	573,929	1,206,684	1,709,436
Ratio to day counts of 1907	2·26	2·23	2·15

Now it will be seen from this table that the persons in receipt of out-door relief outnumber those receiving in-door relief by more than two to one, but the proportion for men, women and children taken separately is different, as is shown by the following table:—

January 1, 1908.	In-door.		Out-door.		Total.	
	Number.	Per cent	Number.	Per cent.	Number.	Per cent.
Men	116,463	52·7	104,559	47·3	221,022	100·0
Women	73,729	21·4	270,096	78·6	343,825	100·0
Children under 16	62,426	26·6	172,366	73·4	234,792	100·0
Total	252,618	31·6	547,021	68·4	798,898*	100·0

* Deducting 741 persons who are counted twice by reason of being reckoned, for various reasons, both as in-door and out-door paupers.

Sex suggests a different method of treatment. Widows with children are mostly given out-door relief; women can often manage for themselves and are given out-door relief when a man could not so keep himself, and he, consequently, is turned over to an institution. There is, moreover, a greater danger of encouraging idleness in giving out-door relief to men than to women.

Statistical information obtained in past years.

Reliable statistical information as regards pauperism has only been obtainable during the last forty years. The statements regarding pauperism previous to the Act of 1834 can be taken only as estimates. There was no machinery for the regular collection of statistics, and such figures as there are related mainly to expenditure. Even after the reforms carried out in the year 1834 the Poor Law Commissioners were unable to establish a reliable system of statistics until 1848, at which date the practice was established of taking a mean of the figures relieved on January 1 and July 1 of each year as the annual estimate of pauperism, but the returns were not complete or thoroughly reliable until the year 1871. In that year the Poor Law Board was superseded by the Local Government Board, there was an increased interest taken in Poor Law problems, and a national system of education had been established in the year previous. That is the date, therefore, from which I think, statistically, it is alone possible to start for purposes of reliable comparison.

Cycles of pauperism.

The Commission came to the conclusion that the cycles of the expansion and contraction of industry and employment occurred with great regularity, following one after another with almost mathematical precision, and an examination of the statistics connected with pauperism shows that pauperism moves in cycles of similar duration to the cycles of industrial expansion and contraction, but the turning points in pauperism are generally from one to two years later than the turning point in employment. It is, therefore, desirable to arrange the figures of pauperism in the cycle into which they naturally fall, and through this progress we arrive at trustworthy results, and the real trend of the figures is revealed in a much clearer way than by annual comparisons.

In the following table the numbers are arranged in the four cycles ending with the year 1905-06, and the four years subsequent are grouped together, though the cycle to which they belong is not complete:—

Cycles.	Mean number of persons relieved.	Mean of the annual rates per 1,000 of estimated population.
1871-72 to 1879-80 (nine years)	747,936	31·2
'80-81 ,, '87-88 (eight years) ...	711,625	26·6
'88-89 ,, '95-96 (eight years)	694,094	23·8
'96-97 ,, 1905-06 (ten years)	718,444	22 2
1906-07 ,, '09-10 (four years)	781,236	22·25

From 1871-72 to 1895-96 there was not only a reduction in the ratio of pauperism, but there was a large reduction in the actual number of persons relieved. Since 1895-96 there has been a large increase in the number of persons relieved, and though the ratio per thousand has not risen, this is solely due to the increase of population. But a closer examination of these figures is more disquieting, because then it will be shown that what has alone kept the figures from attaining much larger dimensions is the great reduction in the number of children receiving relief, which just about counterbalances the great increase in the number of adult men receiving relief:—

	Total Population. (Census of 1901 compared with estimate for 1875.)	Number of Paupers. (Cycle of 1896-97 to 1905-06 compared with cycle of 1871-72 to 1879-80.)
	Increase per cent.	Increase or decrease per cent.
Men..	+ 42·2	+ 18·4
Women	+ 44·1	− 2·4
Children under 16	+ 21·3	− 18·4
All classes	+ 34·8	− 3·9

In this period there were two influences at work which contributed to this result. The Local Government Act of 1894 greatly changed the character of the authorities administering relief by the abolition of the property qualification and of the *ex officio* members. Two years later, the first of the series of Workmen's Compensation Acts was passed and witnesses were practically unanimous in stating that, excellent as has been the operation of these Acts in this direction, they have resulted in making it more difficult for older men to obtain employment, but we were unable to obtain any statistics showing the extent to which each of these measures had increased pauperism. It is also only fair to add that there has been, during this time, a great improvement in the poor law infirmaries and this, no doubt, has contributed to the increase of numbers of persons relieved in institutions.

It has been the practice to classify those receiving relief into young, adult and old, and the ages corresponding to this classification are: 1st, under 16 years; 2nd, 16 years and under 65;

and 3rd, 65 and upwards. The following table shows that, dividing pauperism into these age-groups, the main increase has been between the ages of 16 and 65 :—

Age-groups.	Increase per cent. in estimated population between		Increase per cent. in number of persons relieved between	
	1891 and 1899.	1891 and 1906.	1892 and 1900.	1892 and 1906.
Under 16 years	3·1	4·5	− 8·5	3·7
16 and under 65	13·9	21·5	10·7	28·4
65 and upwards...........	8·4	12·8	8·4	18·6
Total	9·6	14·8	3·5	16·6

The number of paupers in each age-group in 1891 and 1906 is given in the Census of Paupers and they show that, since 1891, men have resorted to poor law institutions at earlier ages than formerly. There has been a progressive increase in the number of men over 20 in receipt of in-door relief, but the rate of male in-door pauperism to male population of the same ages was higher in 1901 than in 1891 at every age from 45 onwards, and the breach widens as age increases.

Occupations of persons relieved.

Perhaps the most interesting of all the information we have obtained was that which related to the occupations or former occupations of the persons relieved. The groups of occupations in which the rate of adult male pauperism is above the average were "General and Undefined Workers and Dealers" (including general labourers), "Fishermen," "Agriculture," "Clothing Trades," and "Building Trades." The rates were lowest for carpenters and plumbers. In these branches the trades unions pay unemployed benefit which is not paid by any of the unions for other branches of the building trades except the Painters' Union.

The rate of pauperism among dock labourers is also very high and, generally speaking, the rate of pauperism is highest in those occupations in which the casual system of employment predominates. The six groups of occupations with the highest rate of male pauperism are :—

	Per 1,000.
General and undefined workers and dealers	84·9
Fishing	40·3
Agricultural : on farms, woods, and gardens	93·7
Dress	24·0
Building and works of construction	22·1
Conveyance of men, goods, and messages	20·3
General rate for all male adults....	21·3

In four out of these six groups employment is intermittent. The pauperism amongst agriculturists is almost entirely one of old age. Now, if casuality be one of the main contributing causes of pauperism and destitution, the grave question arises, has casual labour of recent years increased in proportion to more permanent classes of employment? In the Report of 1834, the references to casual labour are very few and it seems impossible to believe that more pointed reference would not have been made to it if it then formed so large a contributing element of destitution as it now does. I am afraid we must, therefore, assume that this cause of destitution has now assumed, both absolutely and relatively, a larger proportion than in 1834 and such was the unanimous opinion of witnesses coming from industrial centres and especially from London. Once a casual labourer, always a casual labourer. Casual labour of a certain kind is not unpopular with the labourer early in life. If he is young, strong and efficient he is almost certain of getting employment as a dock worker when he applies for it: on the other hand he can break his employment without losing it. But so soon as he has passed his prime, his chances of employment diminish and annually dwindle away. He is tied to the place where he cannot earn an adequate livelihood.

Now the question that was perpetually suggesting itself to me during the five years I was Chairman of the Poor Law Commission was, how comes it to pass that in this country, the richest in Europe so far as the ordinary criteria of wealth are concerned, there is an amount of casual labour in excess of that of any other country in Europe? We have a large part—I think more than half—of the carrying trade of the world and we have, in proportion to the size of this country to the number of our population, a far larger number of first-class seaports and emporia than any other nation, and casual labour seems, unfortunately, to be inseparable from sea-carrying enterprises. I have discussed this matter with many political economists and persons who take a deep interest in social questions. They have been unable to give any satisfactory reason for this most unpleasant development in our industrial system. Now, I venture to make a suggestion to these economists and statisticians present.

Between 1795 and 1815 we were engaged in a terribly exhausting war. Those who deal with the history of that period have given their attention, almost exclusively, to the fighting which took place during that epoch and which centred round the names of the great generals and admirals of that period, but I know of no history which deals with the changes in the economic and industrial life of the country which occurred during that time, but it was the most remarkable and critical period of our industrial development. We entered into that war a well-fed, resolute, somewhat brutal agricultural community with such a capacity for taking punishment that the phrase was coined, "Englishmen do not know when they are beaten." We emerged from that contest victorious and with our soil inviolate but, though we escaped the horrors of invasion, we were terribly punished by the burden of debt we incurred and the heavy taxation imposed to meet that debt and carry on the war.

Owing to the invention of the steam engine and the absorption of almost all Europe in revolution and war, a large portion of the population sprang suddenly, without regulation or method, into great industrial communities, at a time when the heavy indirect taxation necessitated by the war had produced a condition of almost semi-starvation over a large part of the country. Our victories at sea had gained for us the carrying trade of the world, and there was, therefore, a great movement of persons out of employment towards those commercial ports in which there was an increasing demand, during the war, for casual employment. It seems to me that the seeds of the evil of casuality were then laid, and that, sown as they were on soil fertile to their multiplication, we have allowed this evil to extend itself without check or control until it has assumed a magnitude which is a permanent menace to the weal of the country.

It would be very interesting if some statistician or economist would make a careful survey statistically, socially, and economically of the changes which occurred during this most critical period of our national history. We were then fighting for our national existence, and it is not to be wondered at if the statesmen who during that time were in authority, concentrated their attention on pressing external dangers rather than upon the internal development of the country, and thus the germs of evils which have now attained large dimensions were allowed to spread themselves without notice or record.

Duration and recurrence of relief.

The year count enabled us to classify the persons relieved during that period according to the recurrence and aggregate duration of relief, and the results shown are very interesting and are contained in the following table :—

Aggregate duration of relief.		Persons relieved once.		Persons relieved twice.		Persons relieved three times.		Persons relieved four times.		Persons relieved five times or oftener.		Total.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent	Number.	Per cent	Number.	Per cent.
Not exceeding one week....	Number	198,009	13·8	5,025	3·1	663	1·2	155	0·7	57	0·2	203,909	11·9
	Per cent.	97·1	—	2·5	—	0·3	—	0·1	—	—	—	100·0	—
Over one week and not exceeding four weeks	Number	268,660	18·7	45,100	26·2	9,564	17·6	2,413	10·8	790	3·0	326,527	19·1
	Per cent.	82·3	—	13·8	—	2·9	—	0·8	—	0·2	—	100·0	—
Over four weeks and not exceeding thirteen weeks	Number	185,429	12·9	54,989	31·7	20,666	37·9	8,653	38·7	8,027	30·7	277,764	16·3
	Per cent.	66·8	—	19·8	—	7·4	—	3·1	—	2·9	—	100·0	—
Over thirteen weeks and not exceeding twenty-six weeks..............................	Number	108,837	7·6	25,800	14·9	10,705	19·7	5,406	24·2	7,357	28·1	158,105	9·2
	Per cent.	68·8	—	16·3	—	6·8	—	3·4	—	4·7	—	100·0	—
Over twenty-six weeks, but less than the year....	Number	137,535	9·6	39,664	23·2	12,523	23·0	5,415	24·2	9,314	35·6	204,451	12·0
	Per cent.	67·3	—	19·4	—	6·1	—	2·6	—	4·6	—	100·0	—
For the whole year	Number	536,359	37·4	1,063	0·9	303	0·6	321	1·4	634	2·4	538,680	31·5
	Per cent.	99·5	—	0·2	—	0·1	—	0·1	—	0·1	—	100·0	—
Total	Number	1,434,829	100·0	171,641	100·0	54,424	100·0	22,263	100·0	26,179	100·0	1,709,436	100·0
	Per cent.	83·9	—	10·0	—	3·2	—	1·3	—	1·6	—	100·0	—

Looking at the 1,700,000 persons who received relief, they naturally divide themselves into three sections: first, those who were permanent paupers and are included in the last set of figures in the final column; they amount to 538,000 persons. Secondly, we turn to those who were relieved for only a short period, amounting in the aggregate to less than four weeks in the year; that number is contained in the first two sets of figures of the same column, and they amount to 530,000. Thirdly, we find between these two groups are the remainder of persons who were relieved for lengthened periods but not continuously; they amount to 640,000.

Looking upon these figures, it would at once suggest itself that, in a country where there are such an enormous number of charitable institutions, the charities should be so organised as to deal with this vast number of persons, namely, 530,000, who required relief for a limited period. And here let me point out that, although this country is the home of voluntary effort, although in the number, endowment, and wealth of our charities we are, I believe, ahead of every other country in Europe, yet there is not existing in this country that co-operation between charities and public grant relief which there undoubtedly is in France, Holland, Belgium, and Germany, and it seems to me, therefore, that these figures clearly show urgent necessity for a more effectual co-operation between charities.

I do not wish to transfer to charity any of those persons who may have a legal right to public relief, but I am perfectly confident that charity could effectively co-operate with public relief in advance so as to catch up and avert those cases which, if not helped, will gradually sink into destitution and become chargeable upon public funds.

Now, as regards those who were constantly applying for relief and are technically known as "ins-and-outs." They are a comparatively small class but a very pernicious class, and should, I think, require more drastic treatment than they have hitherto received. No less than 26,000 persons received relief on five separate occasions. Cases have been brought to our notice of persons who have been more than 52 times during the year in and out of the workhouse, and one inspector mentioned two cases, one of a woman of 81 who had been in and out of the workhouse 163 times in the year 1901, and the other of a man who had been in and out of the workhouse 523 times since 1884. It is obvious that in dealing with this class some summary power should be placed in the hands of the local authority. Not infrequently, these "ins-and-outs" have children and it seems impossible for the poor law authorities properly to look after, train and educate these children if, as is not infrequently the case, they are liable to be taken at any moment out of the hands of the guardians and made to tramp about the country with their parents.

The statement which I have made to you as regards the numbers of those now receiving poor relief is, in my judgment, very disquieting when we consider that, during the last forty years the expenditure on elementary education has risen from 2,000,000*l.* to 27,000,000*l.* in England alone, and that the increased expenditure upon sanitary improvements during that period cannot be less than 16,000,000*l.* a year.

Whatever other conclusions may be drawn from the figures with which I have dealt it is quite clear, whatever may be the evils connected with our present system of poor relief, they are not of such a nature as merely to require for their improvement or removal, fresh out-pouring of public funds.

Cost of relief.

We have certain statistics available for the estimate of the cost of relief for a period of upwards of a century. In 1775-76 the poor law expenditure in Great Britain was estimated to be 1,556,804*l.* In 1784-85 the expenditure had risen to 2,000,000*l.* Ten years later we became involved in war with France and the poor law expenditure rose with frightful rapidity. I have always regarded this poor law expenditure, though it was local in its character, as a war expenditure, for it imposed taxes, in the shape of rates, upon one particular class of property to meet the distress caused by the contraction of trade due to the war. In 1812-13 poor law expenditure was 6,250,000*l.* Its highest, as compared with 2,000,000*l.* before the war, was reached in the year 1817-18, when an expenditure of 7,870,801*l.*, or 13*s.* 10*d.* per head of the estimated population, was recorded. This expenditure then commenced to diminish and it was reduced to 5,700,000*l.* in 1824, but in 1833 the Royal Commissioners found it at 6,300,000*l.* It gradually increased until in the year 1871-72 it amounted to 8,000,000*l.* sterling.

Now, I have taken the expenditure and the amount per head of the population for the same cycles as those within which I have arranged for estimating the amount of pauperism, and in the following table we find :—

Year.	Poor relief expenditure.	Amount per head of estimated population.
	£	*s.* *d.*
1871-72	8,007,403	7 0¼
'79-80	8,015,010	6 3¾
'87-88	8,440,821	6 0¾
'95-96	10,215,974	6 8½
1905-06	14,685,938	8 7¼

It will be observed that our poor law expenditure has, during this period of forty years, risen from 8,000,000*l.* to nearly 14,000,000*l.* and, notwithstanding the vast increase in population, the rate per head is now 1*s.* 7*d.* in excess of what it was at the beginning of this period.

We cannot ignore that which I have already stated, that during this period there was, co-incident with this increased outlay upon poor law, a heavy and continuous increase of expenditure both in education and sanitary reform. We are certainly now spending on these three objects, in England alone, 40,000,000*l.* a year more than we did at the commencement of that time, and yet, at the conclusion of that time, we have more paupers than we had at the time before we embarked upon this increased expenditure.

Heads of increased expenditure.

I will now turn to the increases of expenditure which, during that period, have occurred under various heads:—

Years in which number of paupers was highest.	In-maintenance.	Out-relief.	Maintenance of lunatics in county and borough asylums, registered hospitals, and licensed houses.	Workhouse and other loans repaid and interest thereon.	Salaries and rations of officers (and superannuation allowances).	Other expenses of, or immediately connected with relief.	Total.
	£	£	£	£	£	£	£
1871–72	1,515,790	3,583,571	742,483	278,566	871,402	1,015,591	8,007,403
'79–80	1,757,749	2,710,778	994,204	319,426	1,053,218	1,179,635	8,015,010
'87–88	1,855,304	2,537,686	1,167,765	585,660	1,342,079	952,327	8,440,821
'95–96	2,254 350	2,644,650	1,556,133	738,237	1,739,264	1,283,340	10,215,974
1905–06	3,229,122	3.374,427	2,355,212	1,189,603	2,491,373	1,977.196	14,616,933
Increase (+) or decrease (–) between years—							
1871-72 and 1887-88 (sixteen years)	+ 339,514	–1,045,885	+ 425,282	+ 307,094	+ 470,677	– 63,264	+ 433,418
1887-88 and 1905-06 (eighteen years)	+1,373,818	+ 836,741	+1,187,447	+ 603,943	+1,149,294	+1,024,869	+6,176,112
Increase (+) or decrease (–) per cent. in 1905-06 as compared with 1871-72	+ 113·03	– 5·84	+ 217·21	+ 327·05	+ 185·90	+ 94·68	+ 82·54

The first column deals with in-maintenance and that has increased 113 per cent. During this period the price of food and drink are now much lower than they were thirty or forty years ago, for the Board of Trade index number of the prices of food and drink in 1871 was 144·6 and in 1907 105·1. Coal, on the other hand, has gone up in price.

Out-relief has diminished considerably. That is due to the reduction of persons in receipt of out-relief.

The maintenance of lunatics has increased 217 per cent.; this is an expenditure which I am sure we would not, in any sense, grudge as the return in comfort and control to these unfortunates has been more than commensurate with the increased outlay.

Workhouse and other loans have increased during that period by 327 per cent.; salaries and rations of officers 185 per cent. In accounting for this higher expenditure, it must be borne in mind that this is largely due to the remarkable improvement that has been made both in the training and number of nurses in poor law infirmaries, who have risen in forty years from 1,400 to over 6,000, and the Superannuation Act which came into operation in 1896 has also contributed to this increase.

But against this augmented expenditure we have a most valuable asset in the hard-working and efficient Civil Service, which has of recent years come into existence in connection with the daily working of our poor law system. The various representatives of these bodies, the clerks of the unions, the masters of workhouses, and the relieving officers, who came before us to give evidence, as well as those with whom we came in personal contact during our visits, generally impressed us very favourably. They were men of capacity, humanity, and with a high conception of the duties which they had to discharge. Of course, those who came before us were rather selected or picked men of their respective classes.

It is satisfactory to know that we have such a service, that their training is steadily improving, and I am confident that, if we can get the administration of the poor law out of the rut into which it has slipped, these men, in the wider and higher sphere of action in which, under the new system, they will be able to operate, will do much to solve some of the troublous problems which destitution presents.

There seems to be an impression amongst certain members of this service that if the proposals for a reformed poor law were put into operation there would be a general reduction, or a considerable dismissal of those who are now in the employ of the Guardians. I, on the contrary, believe that under the new and enlarged sphere of action, within which the Public Assistance Authority would work, there would be not a diminished, but an increased demand for the services of capable officials, and I am quite confident that, under the enlarged area which would supersede those of the unions, and the higher status and efficiency of the authority which would supersede the guardians, a wider career would be open to poor law officials; whilst, unquestionably, the uniformity of administration which we wish to establish would facilitate transference, and would lead to a general improvement in the emoluments and prospects of those engaged in poor law work.

Debt charges and capital cost of institutions.

It will have been noticed that the greatest increase in the preceding table was shown in connection with debt charges, and very large sums have of recent years been borrowed for the erection of new workhouses, infirmaries, and cottage homes, and for the improvement of existing buildings.

We made a very wide inspection of these establishments, their fittings and cost, and, while most desirous that the comfort of the sick and of the old should be a paramount consideration in these institutions, I unhesitatingly assert that we have erred on the side of extravagance on the capital expenditure which has been incurred to bring about these results.

Mr. Davy, the distinguished and well-known head of the Poor Law Department of the Local Government Board, gave us a most interesting table as regards the cost of various classes of poor law institutions:—

Classes of poor law institutions.	1885-89.				1890-94.			
	Number of beds provided.	Cost per bed.			Number of beds provided.	Cost per bed.		
		£	s.	d.		£	s.	d.
Workhouses	1,873	69	2	0	1,468	116	6	0
Infirmaries	484	70	2	0	2,481	200	5	0
Casual wards—								
London	59	107	16	0	168	188	8	0
Extra-Metropolitan	—		—		—		—	
England and Wales	59	107	16	0	168	188	8	0
Cottage homes—								
London	337	182	0	0	—		—	
Extra-Metropolitan	1,310	105	17	0	365	106	5	0
England and Wales	1,647	121	8	0	365	106	5	0

Classes of poor law institutions.	1895-99.				1900-04.			
	Number of beds provided.	Cost per bed.			Number of beds provided.	Cost per bed.		
		£	*s.*	*d.*		£	*s.*	*d.*
Workhouses	7,431	184	4	0	1,893	222	10	0
Infirmaries	4,712	234	10	0	2,272	158	4	0
Casual wards—								
London	247	245	11	0	136	159	16	0
Extra-Metropolitan	621	79	6	0	438	103	16	0
England and Wales	868	126	12	0	574	117	2	0
Cottage homes—								
London	80	164	0	0	2,704	235	10	0
Extra-Metropolitan	1,935	148	8	0	1,904	121	2	0
England and Wales	2,015	149	1	0	4,608	188	4	0

Now the expenditure per bed, as regards certain classes of institutions, is enough to make one stare. Between 1895-99 a number of beds were provided in London to accommodate pauper casuals; each bed so provided cost 245*l.* If we turn to the last column we will see that, as regards children's accommodation, each bed in a cottage home built for the metropolis cost over 235*l.*

A great deal of this enlarged expenditure has been necessary, but it has in recent years passed reasonable limits, for I do not think that anyone can justify such extravagance as that to which I have called attention in these two particular classes of cases. These cottage homes are charming institutions, and, I believe, have been most successful in the education they have given to the children, but the expenditure is far in excess of that which is incurred under the various other systems for the maintenance of children, and those systems have, on the whole, been most satisfactory in their results, as very few of the children so trained have, in after life, returned to swell the ranks of pauperism.

One of the poorest unions in London is, at the present moment, educating children in its cottage home at a cost, including debt charges and maintenance, of 1*l.* a week per head. I make no comment further than to say that there are very few parents in the lower middle class who can afford to spend such a sum on the maintenance and education of each of their children.

It must be further noted that in a number of cases the children educated at this cost are one of a family the other members of which are in receipt of relief, but if they be on the out-door list these children would probably not receive more than 2*s.* a week from the same board of guardians that is spending 1*l.* upon their brothers and sisters.

Out-door relief.

The reduction in the number of those receiving out-relief is considerably more than the reduction in cost, and this is due to the fact that the average amount granted in recent years to individuals has risen. In my judgment the general system upon which out-door relief is administered in Great Britain is most unsatisfactory. In a very large number of cases the relief given is a mere dole; it is unconditional and not associated with any proper supervision over the individual. I quite agree with those who think that this system is so pernicious that every effort should be made to bring it down to the smallest possible dimension. On the other hand, it should be remembered that in every other country except England and Wales and Ireland (the poor law system of Ireland is a copy of that of England) the relief given is mostly out-relief. In Germany, Belgium and Holland the relief is almost entirely of a domiciliary character, but there is careful supervision over the home and over the person so relieved.

My own belief is that this system is, if properly worked, the best method of relief for a very large number of cases, but to be effective it requires a very close supervision and contact with the persons relieved. One of the many objects of the Poor Law Commissioners was to effect an improvement in this respect, and to try to bring into co-operation with the future Public Assistance Authorities willing workers, who, in conjunction with them, would undertake this work of advice and supervision and report. This is the foundation of the celebrated Elberfeld system in Germany which has worked most satisfactorily.

I now put together in two tables the number of persons relieved during these cycles and the annual expenditure per pauper:—

Cycles.	Mean number of persons relieved.		Mean of annual rates of expenditure per pauper.	
	Number.	Increase (+) or decrease (−) as compared with previous cycle.	Mean.	Increase as compared with previous cycle.
			£ s. d.	£ s. d.
1871-72 to 1879-80	747,936	...	9 11 8½	....
'80-81 „ '87-88	711,625	− 36,311	10 12 0½	+ 1 0 4
'88-89 „ '95-96	694,094	− 17,531	11 14 4¼	+ 1 2 3¾
'96-97 „ 1905-06	718,444	+ 24,350	14 13 10¾	+ 2 19 6½
1906-07 „ '09.10 (Cycle incomplete)	781,236	+ 62,792	....	....

The result is most disquieting. The increase of expenditure has not resulted in a diminution of pauperism but, on the contrary, while the increase per head during the last complete cycle as compared with the previous cycle is nearly 3*l.* per head, the number of paupers is 87,000 more in the last four years than it was in the cycle of 1888-96.

I saw a newspaper heading the other day, "Unprecedented Reduction in the Number of Paupers." I bought the paper in order to ascertain to what it referred. It appears that, owing to the improvement in trade, there has been a reduction in pauperism during the last year and the figures are reduced to 759,000, or 10,000 less than they were four years ago. This does not seem to me to be much to boast of.

Local distribution of pauperism.

I now turn to the distribution of pauperism, contrasting first, the counties, and second, the unions one with another.

In the counties, pauperism is highest in the East and centre of England and lowest in the North. Thus :—

	Per 1,000.		Per 1,000.
Northumberland	19·5	Lancashire	17·6
Westmorland	19·4	Yorkshire	15·7
Chester	19·3		

In the East :—

	Per 1,000.		Per 1,000.
Norfolk	38·5	Suffolk	36·4

In the South and West :—

	Per 1,000.		Per 1,000.
Dorset	37·3	Anglesey	36·5

The divergence in unions between the highest and lowest rates is remarkable.

I give in the following tables the six unions with the highest and the six with the lowest rates :—

Highest rates per 1,000.		Lowest rates per 1,000.	
Strand (London)	73·1	Saddleworth and Todmorden (both in Yorks, W.R.)	10·3
Poplar (London)	56·8	Lunesdale (Lancs)	9·9
Thingoe (Suffolk)	56·7	Haslingden (Lancs)	9·8
Mildenhall (Suffolk)	55·1	Lancaster (Lancs)	9·3
Dore (Hereford)	53·7	Hampstead (London)	8·7
Cosford (Suffolk)	53·2	Fylde (Lancs)	8·5

Urban and rural pauperism.

During the period under review, there has been a continuous migration of the population from the rural to urban districts and such a migration should in itself have a two-fold effect upon pauperism. It is the younger and more active people who have so migrated, leaving behind them the older folk; therefore, the ratio of old persons in the districts so decreased increases per 1,000 of the population. In the districts augmented by this migration, the reverse holds good: the ratio of old people diminishes in proportion to the increase of population; therefore, this movement should have brought about, assuming there were no other disturbing cause, an increase per 1,000 of pauper population in the rural districts and a decrease in urban districts: but exactly the opposite is the case. Rural districts, though starting on a higher level of pauperism, have during this period almost continuously decreased both in the ratio and actual numbers of their paupers. The towns, on the other hand, have almost without exception increased in the actual number of their paupers though, in certain instances, the addition to their population has prevented a rise in the ratio per 1,000.

Now, under the heads 1 and 2 of this table, the pauper population of the urban unions has so largely increased that, notwithstanding the growth of population, if we take 1905-06, a bad year, the ratio has risen. Under head 3, the number of paupers has increased, but the ratio has fallen. When we come to London we find that, notwithstanding the great increase of population, the actual number of paupers has increased by 36,000, and the ratio has risen from 20·5 to 25·1.

Under the last three heads, 5, 6, and 7, dealing with semi-rural or wholly rural unions, in every case there has been not only an actual diminution of paupers, but this has amounted to such dimensions as to reduce the ratio. We may, therefore, lay it down as an incontestable statistical and social fact that the really difficult problems of modern destitution and pauperism are centred in the industrial communities and not in the rural localities, and within these industrial centres they are growing rather than diminishing in intensity.

A closer examination of these statistics shows that the condition of the urban areas is even worse than that disclosed by the table. Dividing those receiving relief into the heads of men, women, and children, it is found that the movement in male pauperism is everywhere more unsatisfactory than the movement in pauperism amongst women and children. The increase in male pauperism has wholly occurred in London and other urban areas.

From whatever standpoint we regard these statistics, they

Pauperism in urban and rural areas (excluding insane and casuals).

Groups of unions (arranged in order of rate of increase in population between 1891 and 1901).	Estimated population in middle of 1905.	Rate per cent. of increase in population between 1891 and 1901.	1891-92 (a good year).		1895-96 (a bad year).		1900-01 (a good year).		1905-06 (a bad year).		Increase (+) or decrease (−) in rate per 1,000 of population between 1895-96 and 1905-06.
			Mean number of paupers.	Rate per 1,000 of estimated population in 1891.	Mean number of paupers.	Rate per 1,000 of estimated population in 1895.	Mean number of paupers.	Rate per 1,000 of estimated population in 1900.	Mean number of paupers.	Rate per 1,000 of estimated population in 1905.	
Unions of which the following proportions of the population are comprised in boroughs or urban districts—											
1. 75 per cent. and under 100 per cent.	9,783,000	18·33	141,019	18·4	160,350	19·6	157,396	17·6	188·011	19·2	− 0·4
2. 100 per cent. (extra-Metropolitan unions wholly urban)	8,685,000	17·11	132,955	19·3	151,846	20·6	143,763	17·9	177,047	20·4	− 0·2
3. 50 per cent. and under 75 per cent.	4,565,000	12·52	95,619	24·4	99,769	24·4	93,010	21·7	102,174	22·4	− 2·0
4. 100 per cent. (London)	4,685,000	7·29	86,570	20·5	98,738	22·5	96,637	21·1	117,466	25·1	+ 2·6
5. 25 per cent. and under 50 per cent.	3,505,000	3·48	109,470	31·8	111,991	32·3	97,618	28·2	100,470	28·7	− 3·6
6. Nil (unions wholly rural)	1,324,000	2·09	40,576	31·1	40,922	31·3	36,529	28·0	38,348	28·9	− 2·4
7. Under 25 per cent. but not wholly rural	1,606,000	− 0·48	56,183	33·8	57,490	34·8	50,857	31·1	51,349	32·0	− 2·8
England and Wales	34,153,000	12·17	662,392	22·8	721,106	23·7	675,810	21·0	774,865	22·7	− 1·0

certainly suggest a most regrettable condition of affairs in the urban districts, and London is the worst of all the urban districts. London is maintaining many more paupers than it did in the eighties. At that time the ratio of pauperism for London was below that for the rest of England and Wales. It has now risen above that average, and the numbers of adult men maintained in institutions in London is greater than in any other part of the country.

I look forward with great apprehension to the industrial future of London. The higher wage demanded by the London unions and the heavy increasing burden of local taxation is forcing skilled and organised industries out of London. There is unlimited boy occupation of a casual and intermittent character. This ceases when the boy so employed reaches to adolescence. They have learnt no trade; they are not fitted for continuous skilled industry. Their main chance of obtaining employment is on the unskilled market, and their light physique disqualifies them from effective competition with the countryman for this kind of employment.

General workhouse as a deterrent.

For the last eighty years a governing feature of poor law administration has been the general application of the workhouse test. This test was proposed by the Poor Law Commissioners of 1834 as an instrument for the reduction of the vast amount of able-bodied pauperism then in receipt of relief. But it should always be remembered that that same Commission recommended the classification in institutions which, in other words, is a condemnation of a general workhouse.

A test with institutions properly graduated and classified is one thing, and might be made to work effectively as a deterrent to those whom it is desirable to deter, and yet be an encouragement to respectable persons who have lost their power of maintaining themselves.

But the workhouse test as now administered is, not infrequently, an attraction to those whom it should deter, a deterrent to those legitimately entitled to relief.

The cost of these gigantic establishments, resembling in many cases a town rather than an institution, is very great, and the comfort of their interior arrangements and food attract, physically, the ne'er-do-well, whilst they act as a moral deterrent to the respectable poor from the contact they necessitate with the disreputable.

The general workhouse, while it has placed many heavy burdens upon the rates has, from the deterrent point of view, been a failure

It is in the big urban districts and notably in London that the size and extravagance of these institutions have attained the largest dimensions, yet it is in these districts that pauperism has, in recent years, most increased. But the workhouse test is more rigidly applied in urban districts than in rural, and most rigidly of all in London.

Some more effective and less costly method of control is urgently required in place of this extravagant and discredited deterrent.

Children.

As the preceding tables have already shown, there has been a considerable reduction in the number of the children in receipt of poor relief since the year 1871. Arranged in the usual cycles the statistics are as follows :—

Cycles.	In-door.	Out-door.	Total.
1871-72 to 1879-80	47,814	220,765	268,579
'80 81 ,, '87-88	54,863	205,330	260,193
'88-89 ,, '95-96 ...	51,002	184,439	235,441
'96-97 ,, 1905-06	52,661	166,475	219,136

This reduction in the actual numbers is the more satisfactory when it is known that during that period the child population has increased by 21·3 per cent., and the child pauperism has decreased by 18·4 per cent.

By far the most satisfactory part of the present administration of the poor law is in connection with children. The guardians have, on the whole, done their duty well in the provision and education which they have given to children who come under their direct control. The various forms of accommodation provided for these children consists, first in district schools of large dimensions; secondly, in homes; thirdly, in cottage homes; fourthly, boarding out.

There are, in addition, a considerable number of children still in the workhouse, though every effort has been made by the Local Government Board to reduce this number, as all experience shows that it is most undesirable to train any children in the belief that the workhouse is their home.

The general results of these forms of training and education have been most satisfactory; few of the children so educated have, in after life, come back upon the poor law.

But, .satisfactory as is the reduction in the total number of children receiving relief, it must be borne in mind that the reduction has chiefly been in the number of widows' children, while the number of children of other able-bodied parents receiving relief has increased. The reduction certainly, during the last fifteen years, has been almost entirely in the rural districts.

Able-bodied.

The number of able-bodied actually in relief is comparatively small, but the figures in relation to the able-bodied are most interesting, and require the most careful watching, as they show the trend and tendency both of trade and of destitution.

The figures relating to the able-bodied show the same feature which has been apparent right throughout the mass of figures which I have submitted to you. The analysis made of the figures in urban and rural unions separately shows that, while the numbers have diminished in the rural unions, they have increased in the urban unions. This movement is clearly brought out by the following table:—

Increase or decrease per cent. in number of able-bodied men in health.

Groups of unions.	In-door.		Out-door.	
	Between 1891-92 and 1900-01.	Between 1895-96 and 1905-06.	Between 1891-92 and 1900-01.	Between 1895-96 and 1905-06.
Unions in London	+ 0·7	+38·4	+ 6·6	+137·9
Extra-Metropolitan unions—				
1. Unions wholly urban	+12·8	+24·4	− 5·5	+133·8
2. Unions partly urban and partly rural of which the following proportions of the population are comprised in boroughs and urban districts:—				
(*a.*) 75 per cent. and upwards	+34·0	+19·2	−32·6	+ 56·3
(*b.*) 50 per cent. and under 75 per cent.	− 3·5	+ 2·3	−48·9	− 18·5
(*c.*) 25 per cent. and under 50 per cent.	− 6·4	+ 8·4	−45·0	− 39·3
(*d.*) Under 25 per cent.	−26·1	−19·0	−44·2	− 34·4
3. Unions wholly rural	−30·0	−33·7	−41·0	− 37·7
England and Wales	+ 6·5	+21·2	−28·4	+ 49·9

I am afraid that the above figures bring one to the conclusion that it is in regard to the able-bodied paupers that the least progress has, in recent years, been made. It would seem as if there had been a considerable retrogression in this branch of the poor law. One of two conclusions is, I fear, indisputable—either the urban population is becoming less capable of maintaining itself, or the facility with which relief can be obtained and the immunity from labour which it confers are enticing a larger number of persons to avail themselves of poor law relief.

Sick.

The institutions for the reception of the sick have made a vast improvement during the last five-and-twenty years, and great credit is due in this respect to certain boards of guardians in London and other towns who have brought the infirmaries under their control up to a very high state of efficiency. The poor law infirmaries of Camberwell and Fulham in the metropolis, of West Derby, Leicester, and Birmingham (I mention these five as typical of the very high state of efficiency) are equal in their treatment, their equipment and nursing to the best hospitals in the country, and no doubt this great improvement in treatment has induced larger numbers than before to have recourse to them, and accounts for a certain proportion of the vast growth of expenditure.

Of the persons under medical treatment, the most important groups are as follows:—

(1) Bronchitis and pneumonia, 44·0 per 1,000 of the total number of persons relieved.

(2) Rheumatism and gout, 19·9 per 1,000 of the total number of persons relieved.

(3) Pulmonary tuberculosis, 15·8 per 1,000 of the total number of persons relieved.

(4) Heart disease, 13·9 per 1,000 of the total number of persons relieved.

(5) Ulcerated legs, 12·1 per 1,000 of the total number of persons relieved.

and

	Proportion under medical treatment per 1,000 in-door and out-door paupers (taken together) at each age-group.					
	Children under 16 years of age.	Men.		Women.		Total.
		Under 50 years of age.	50 years of age and upwards.	Under 50 years of age.	50 years of age and upwards.	
London (31 unions)—						
In-door	174·0	603·2	318·7	393·8	261·7	292·9
Out-door...............	54·0	92·0	56·7	118·2	120·9	85·0
Total	228·0	695·2	375·4	512·0	382·6	377·9
Extra - Motropolitan unions (97 unions)—						
In-door	41·7	313·7	183·7	156·3	117·7	126·8
Out-door	58·8	215·2	127·7	152·7	172·9	131·4
Total	100·5	528·9	311·4	309·0	290·6	258·2

There are a very large number of excellent medical charities in

London, yet, notwithstanding this provision, the number of persons treated by the poor law in London is considerably higher than those seeking medical relief in the provinces:—

	Excess (+) or deficit (−) of London proportions under medical treatment over provincial proportions.		
	In-door.	Out-door.	Total.
Children	+ 132·3	− 4·8	+ 127·5
Men under 50	+ 289·5	− 123·2	+ 166·3
,, 50 and upwards	+ 135·0	− 71·0	+ 64·0
Women under 50	+ 237·5	− 34·5	+ 203·0
,, 50 and upwards	+ 144·0	− 52·0	+ 92·0

Summary and conclusions.

Summarising the figures which I have laid before you, they are most unsatisfactory, not only as regards the number of paupers now in receipt of relief but also in the development of pauperism in recent years which they indicate. The growth of expenditure is shown to be enormous.

Taken in combination, they show a deplorable condition of affairs. We, the richest nation in Europe, have the heaviest pauperism, yet the more we spend, the worse the position seems to be. It is in London and the large towns, the supposed centres of progress, that the problems of pauperism are becoming more and more acute and difficult. It is adult pauperism that is on the increase. Is it not time to effect thorough changes in the methods and in the machinery of the administration which, in spite of the enormous cost, have achieved these untoward results?

I have no wish to attack or blame guardians as a body. Many of them are capable, hard-working men whose services would be most valuable in the new and enlarged sphere of public assistance which we proposed, on their abolition, to establish. They were suddenly brought into existence in 1834 to deal with conditions which have since passed away and the new conditions which have taken their place require a fresh treatment, new methods and a higher type and standard of administrative supervision.

Let me say a few words as regards their numbers and the areas they administer.

There are 645 unions in England and Wales and these unions are administered by 24,613 guardians.

The population of a union ranges from 2,265 inhabitants to 580,000 inhabitants. Of the 645 unions no less than 197 overlap and cut into the boundaries of administrative counties or boroughs.

There is scarcely a big town in the country which is not intersected and divided for poor law purposes by two or more boards of guardians. The areas so administered are purely artificial; they were created 80 years ago by the process of selecting a market town and surrounding it with adjacent parishes. If the system of local government now in force had been in operation at the time of the Report of the Poor Law Commission of 1834, neither the area of the union as an administrative unit nor a board of guardians as an administrative body would have been thought of.

The area is universally admitted to be too small for the classification, by institutions, of persons seeking relief, and yet such a classification is the key-stone to the reform of the general workhouse.

Both unions and boards of guardians were, at the time of their erection, make-shifts, and now as make-shifts they have outlived their utility.

The result of the very laborious and almost unique examination which the Poor Law Commission made of the local administration of the country convinced me and the majority of my colleagues that of all classes of duties imposed upon the local authorities, none were more difficult or required a higher combination of judgment, patience, industry and acumen than those relating to the administration of the relief of the poor, especially in the adjudication of cases and the application to them of proper treatment.

As regards popular elected bodies, I think you may statistically lay down this principle as incontrovertible, that the composition of an elected authority rises in status, ability and efficiency in proportion as the electorate takes an interest in its election and in the performance of its duties. We had some instructive figures laid before us by the London County Council as to the proportion of voters who took part in the various elections within the metropolis. At the Parliamentary election of 1906, 78·3 per cent. of those qualified to vote voted; at the County Council election in the next year, 55·5 was the proportion; in the borough elections of 1906, 48·2 borough voters took part in the contest; but at the guardians elections in 1907 only 28·1 thought it worth while to come to the polls. I, therefore, think it is clear that our first duty is to try to transfer the duties now discharged by the authority which, according to this test, is the least capable and efficient of the elected authorities in the country, to some body which will possess higher qualifications for the discharge of these duties.

Composition of the Poor Law Commission.

Those who oppose this change, largely base their objection on the ground that the Poor Law Commission who made these recommendations was not a practical body and that it had not sufficient previous personal experience of the questions upon which it reported to justify it in proposing such sweeping changes.

Let me examine statistically this contention.

The Poor Law Commission consisted of eighteen persons. Three of those eighteen were the heads of the Local Government Boards of England, Scotland and Ireland—men who, all their lives, had dealt with poor law problems. Another member of the Commission was the Senior Medical Inspector of the Local Government Board. There were, in addition, five members of the Commission all of whom either were or had been chairmen of boards of guardians. There was the Chairman of the Unemployed Committee of London. There was a distinguished Professor of Political Economy who had given all his life to the study of poor law problems, and the remaining five persons of the Commission consisted of Mr. Loch, Secretary of the Charity Organisation Society, Miss Octavia Hill, Mrs. Bosanquet and Mrs. Sidney Webb—three ladies who have all attained the very highest eminence in their respective spheres of special work—and myself. I was the only member of the Commission who had not had a long training and experience of the question upon which we had to report.

But we were not content to rest upon the general personal knowledge, great as it was, of individual members of the Commission. We visited upwards of 200 unions in England and Ireland and 50 parish councils in Scotland, and saw and heard them at work. We attended 160 meetings of local bodies, and we visited upwards of 400 institutions in connection with those bodies.

But we did not trust or entirely rely upon the actual evidence of our own eyes and ears, convincing and conclusive as that was to ourselves. We examined 452 witnesses, including almost everyone who has attained eminence in poor law administration. Our oral answers exceeded 100,000 in number, and we, in addition, received statements of evidence or replies to questions from 900 persons whom we had not examined orally. We further appointed 14 groups of special investigators, all of whom were persons of experience and knowledge, to report upon certain aspects of the subject. I think I may claim that no commission or body entrusted with public investigation ever took more trouble or was more successful in getting to the practical roots of the subject which was referred to them, or obtained clearer or more accurate information concerning the daily discharge of the duties of those upon whom they were called to report.

Procedure for giving effect to proposal.

One of my reasons for selecting this subject as a Paper to be read before you was that I felt certain that the statistical facts which I could lay before you would convince all of the urgent necessity of drastic and thorough reform.

I quite admit the difficulties and the obstructions which will have to be overcome when so widespread and deep-rooted an institution as boards of guardians have to be abolished. The suggestion which I would venture to make to the Government is that they should divide this part of our proposed reforms into three sections.

That in the first year they should deal with London, which is not only ripe, but is crying out for an improvement in its poor law administration.

That in the second year they should deal with the big boroughs. There is scarcely a large borough in England the municipal area of which does not contain parts of two or three separate boards of guardians. Liverpool has four boards of guardians operating within its municipal area; Leeds has three; Birmingham has three. Now I contend that poor law administration is the first of municipal duties, and in each of all the big boroughs of England the areas of poor law administration and of the ordinary municipal work of the borough should be the same.

In the third year they should deal with the counties, but, as I have shown, the administration in counties, as examined statistically, has steadily improved, and there is not nearly so urgent a need for reform as there is in London and the big boroughs.

At present the semi-rural and rural unions have a great excess of institutional accommodation, as the following table will show:—

Administrative county unions ...	528
Number of institutions	565
Accommodation as estimated by the Local Government Board	119,535 beds
Number of inmates March 31, 1906 ...	79,454

As the operation of the Old Age Pensions Act becomes greater and greater, so will the number of old paupers seeking institutional relief steadily diminish throughout the rural counties. I have little doubt that in a short time the existing accommodation will be double that which is ordinarily required. The counties, therefore, have a strong financial interest in adopting this part of our reforms for it will enable them to dispose of these buildings to other authorities or to adapt them to purposes other than those connected with the poor law and, financially, they will gain both ways, by the sale of the institutions and by the reduction in establishments which they will thus be enabled to make.

The figures I have laid before you as to the amount and character of the pauperism in this country are bad, but taken in combination with the figures relating to expenditure, they reveal an alarming condition of affairs, for they show that through the clumsiness of our methods and the inferiority of the machinery in charge of these methods we are aggravating, at vast cost, the very evils we intended to extirpate.

I hope all who hear or read this will be impressed by the gravity of the situation thus revealed, and use their voices and influence in pressing upon Government and Parliament the urgent necessity of a rapid and thorough reform of our poor law system.

PROCEEDINGS *on* NOVEMBER 15, 1910.

AFTER the formal business of the meeting had been disposed of, Mr. R. H. REW (Honorary Secretary) announced that Mr. W. H. Clark had resigned the office of Honorary Secretary on his appointment as member of the Viceroy's Council in India, and that Mr. A. W. Flux had been elected by the Council to succeed Mr. Clark as an Honorary Secretary.

The PRESIDENT announced that Mr. G. H. Wood, to whom he was to have presented the Guy medal in silver for his series of papers on "The Statistics of Wages in the United Kingdom during the 19th Century," was unable to be present.

Mr. REW re-announced that the subject of the next Howard Medal Competition, 1910-11, would be "A statistical view of the variation during the last twenty years in the consumption of intoxicating drink in the United Kingdom, and in convictions for offences connected with intoxication, with a discussion of the causes to which these variations may be ascribed." Essays were to be sent in before June 30, 1911.

The PRESIDENT, having delivered his address,

Sir ALFRED BATEMAN said it was his privilege, as senior past President, to propose a very hearty vote of thanks to their President, Lord George Hamilton, for the masterly address he had given them. It was the universal rule of the Society not to discuss the President's address, a rule which he did not think had ever been broken, and indeed it was very desirable to observe it. Although there were many statistical points brought forward which he was sure many present were longing to talk about, they had better keep to the old practice. But he would dare to break this practice in one respect, because he noted in the early part of the address the President said that, though he had been many years a member of the Society, he had not been able to take any active part in its proceedings. He seemed to remember some years ago the reading of an excellent paper by Lord George Hamilton, on "Trade and Shipping," and if that was not taking an active part in their proceedings he did not know what was. If each one of their 900 Fellows of the Society gave a paper good enough to pass the rather severe ordeal of the Council, they might consider they had a very active body indeed. He had heard a great many addresses there, but he did not think he had ever heard one more interesting or more appropriate. Lord George had given them a clear and concise, and at the same time a very exhaustive statement, mainly relating to what he might call "the agreed facts" which came before him as Chairman of the Royal Commission on the Poor Law; there was very little which could be called, either from the point of view of the majority or the minority of the Commission, controversial. It was a statement which should cause them to think very deeply on the sad state of pauperism in this country, especially in the great towns, and on that account it was most timely and useful.

Sir ATHELSTANE BAINES, in seconding the vote of thanks, said he thoroughly associated himself with what had fallen from Sir Alfred Bateman; and he was sure the Society was intensely gratified in having as their President for the year one who had had so long and distinguished a career in public life. Lord George Hamilton might not have been assiduous in his attendance at these meetings, but that he had profited, in his absence, by his connection with the Society might fairly be assumed from the statistical sense of proportion and analysis exhibited in the papers he had read before them. On the present occasion, the President had dealt with a question which was undoubtedly one of the most important of the day, and one, too, eminently suited for the consideration of the Society, because, above others, it stood in need of statistical handling. The condition of the poor and the misery which existed all around, were subjects which attracted the attention of all, and under the impulse of philanthropic enthusiasm reforms might be suggested which specially required the corrective influence of economic investigation and guidance. In that investigation the aid of statistics and experience in interpreting them were essential, and he hoped that the weight and sense of responsibility with which the President had invested his address would be also present in carrying out the reforms in question, and restricting them to the objects for which they were immediately intended. There was one matter mentioned in the address which would be very gratifying to many of those present, viz., the success with which the Commission obtained statistics by means of a special census placed in the hands of a thoroughly efficient agency. Three of the five or six questions fell within the scope of a general census, while the rest were, so to say, technical or descriptive. Without this inquiry, the Commission could not have had the evidence upon which they formed their conclusions. Without having made a special study of the Poor Law returns, he had often thought that they somewhat repelled investigation by their volume of detail, as well as by the absence of that very detail which the Commission had been obliged to collect independently. In seconding the vote of thanks, he would express the hope that he might ere long have to propose or second one congratulating their President upon the adoption by the Government of the day of the conclusions to which the investigations of the Commission had led.

The vote of thanks having been carried unanimously,

The PRESIDENT, in reply, said he always felt that reading a paper was rather hard work for the person who read it, but perhaps it was harder still for those who had to listen to it. They had listened to him very patiently, and he was very pleased to hear what Sir Alfred Bateman was kind enough to say, that his paper was not below the standard of presidential addresses.

The following candidates were elected Fellows of the Society:—

Harold Boag, A.I.A.
Alexander Bannerman Bruce.
Harold William Butler.
Sydney Edwardes.
H. Trustram Eve.
Gilbert, Francis Garnsey.
C. S. Goldman, M.P.
Saratkumar Dutta Gupta, M.A.
H. Pierson Hammond.
Ralph D. Hincke.
Henry Fraser Howard.
Thomas James Pitt Hurst.
Robert Leslie.
G. D. Maynard.
H. R. Maynard.
Pramatha Nath Mukherji, M.A.
Ralph Stanley Osborne.
Edward Gordon Peake.
Richard Price-Williams.
Hon. Francis Albert Rollo Russell.
William Henry Slough.

MISCELLANEA.

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I.—*The Amount and Distribution of Income (other than Wages) Below the Income Tax Exemption Limit in the United Kingdom. Report of the Committee of the British Association, consisting of* Professors E. CANNAN (*Chairman*), A. L. BOWLEY (*Secretary*), F. Y. EDGEWORTH, *and* H. B. LEES SMITH, *and* Dr. W. R. SCOTT.

Introduction.

THE Committee, which was appointed at the Dublin meeting, has proceeded with its investigations and collected information during two years; and though a complete account of the amount of income with which it deals cannot be given, it is now possible to survey the ground and to make an estimate which it is believed is better founded than any previously made, and which is nearly as accurate as is possible in the existing state of official statistics.

It is customary to divide the aggregate of incomes of the inhabitants of the United Kingdom into three groups:—first, those incomes which are subject to income tax, *i.e.*, which are over 160*l.* per annum according to the definitions of the Income Tax Commissioners; secondly, those incomes which are received as wages and come under the cognisance of the Labour Department, and are included in estimates of earnings of manual workers; and thirdly, an intermediate group, which is included in neither of the former. It is the aggregate of the income in this third group that the Committee has to estimate.

The procedure of the Committee has been to collect all the statistics relating to members of this group which are published officially or semi-officially, to apply to public bodies for data as to the salaries paid to their employés, and to apply to societies representing professional and other classes for any statistical information they had as to the numbers in such groups and their incomes. For other classes the Committee made direct applications for information in all quarters where it seemed probable that a response would be received. In this matter they were greatly helped by the Manchester Statistical Society, who conducted a careful and useful investigation in the neighbourhood of Manchester. The circular of inquiry which follows was used extensively for the collection of fresh data:—

SIR,—It is of great importance for many practical and scientific purposes to know the total of the National Income and the relative number of persons in receipt of incomes of different amounts. The total may be divided into three classes: (*a*) amount subject to income-tax; (*b*) amount received as wages; (*c*) remainder. Fairly adequate information is extant for classes (*a*) and (*b*), but no serious inquiry, official or private, has been made in recent years as to (*c*), and this unknown amount is the subject of vague and misleading guesses. Absence of information on this subject is one of the most serious gaps in our national statistics, which are otherwise becoming fairly complete. The work of the Committee named above is to form a reasoned estimate as to the numbers and income of persons, where income from all sources is less than 160*l.* and does not arise from wages. Apart from persons in receipt of pensions, annuities, and dividends (as to whom the Income-tax Commissioners give some information), the class in question consists largely of *clerks*, teachers, shop assistants, &c. The Committee, having considered the practicable means of forming an estimate, is of opinion that the answers to the questions on the annexed schedule, which is being issued to a number of Companies and Corporations, would be of material assistance to them in their task, when used in conjunction with the Population Census and other information. The Committee will, then, be greatly indebted to you if you will fill in the details asked as to your Firm, Company, or Corporation, and return the form at your early convenience.

The returns will be used only for purposes of averages and will be regarded as *strictly confidential;* no name, whether of an individual or of a company, will be used in the report.

I am, &c.

CONFIDENTIAL.

Year and locality to which information applies________________

Nature of business or occupation________________________

[If shop assistants in retail business or commercial travellers are employed, details should be given under the same headings on a separate page.]

A. *Number* of partners, managers, clerks, &c., who draw more than 160*l.* per annum.

Men________________ Women________________

B. *Number* of partners, managers, clerks, &c., who draw 160*l.* or less. (Do not include (i.) workmen, porters, messengers, &c.—*i.e.*, those in receipt of wages—or (ii.) clerks, &c., who do not give their full time to your business.)

Men and lads____________ Women and girls____________

As regards B.

Total amount paid to these clerks, &c. .... £____________

The above will give the essential information, but it is also important to fill in the following table :—

Number of clerks, &c. (under B), whose incomes fall within the following limits :—

	Men and lads.	Women and girls.
140*l.* to 160*l.*		
120*l.* ,, 140*l.*		
100*l.* ,, 120*l.*		
80*l.* ,, 100*l.*		
60*l.* ,, 80*l.*		
40*l.* ,, 60*l.*		
Under 40*l.*		

CONFIDENTIAL.

Use this page for *shop assistants* only. Exclude clerks, artisans, and labourers.

A. Number who draw more than 160*l.* per annum.

Men ______________ Women ______________

B. Number who draw 160*l.* or less.

Men and lads ____________ Women and girls ____________

As regards B.

Total amount paid to these assistants per annum .... £________

Number whose annual salaries fall within the following limits:—

	Without board or residence.		With board or residence.	
	Men and lads.	Women and girls	Men and lads.	Women and girls.
140*l.* to 160*l.*				
120*l.* „ 140*l.*				
100*l.* „ 120*l.*				
80*l.* „ 100*l.*				
60*l.* „ 80*l.*				
40*l.* „ 60*l.*				
20*l.* „ 40*l.*				
Under 20*l.*				

It is evident that there is no clear line of division between the wage-earning group which is dealt with by the Labour Department and the intermediate group. Salaries, especially those of lads and of young men, are very frequently less than wages, so that it is not a question of amount of annual income. Again, there is no simple distinction between clerical and manual work, for many occupations involve both. Further, such important classes as shop assistants and small shopkeepers might equally well be included in either class. But it is not a definition in accordance with the nature of the occupation that we must aim at, but rather a question of fact as to whether certain classes do or do not come under the cognisance of the Labour Department and are or are not included in the estimates of aggregate wages based on their statistics. The Labour Department, however, does not issue an official estimate of aggregate wages, and in the end it will be necessary for each statistician to decide to what classes of persons the data published by the Labour Department relate, to estimate the aggregate wages of such groups, and to place the remaining groups either in the intermediate or in the income-tax paying classes. From this point of view it is not essential to elaborate the grounds of the delimitation actually adopted, for all occupied persons must be, in fact, included in one or other of the classes, and it does not matter whether they are included as wage earners or as salaried, since the income allotted would be much the same in each group.

When we have separated out wage earners, so far as the population census allows, from other occupied persons, we obtain the numbers shown in the adjoining table.

Number of persons in the three groups.

Census of United Kingdom, 1901. *Occupied classes, other than manual labourers working for employers* (*over* 10 *years old*).

	Males—000's.				Females—000's.			
	England and Wales.	Scotland.	Ireland.	United Kingdom.	England and Wales.	Scotland.	Ireland.	United Kingdom.
1. Civil service (officers and clerks)	42	4	6	52	14	2	2	18
2. Local government officers	26	3	4	33	11	—	1	12
3. Army officers	13	1	1	15	—	—	—	—
4. Navy ,,	5	—	—	5	—	—	—	—
5. Clergy of all denominations	40	5	6	51	—	—	—	—
6. Barristers and solicitors	21	4	3	28	—	—	—	—
7. Law clerks	34	6	2	42	—	—	—	—
8. Doctors, dentists, veterinary surgeons, engineers, surveyors, architects	59	8	6	73	1	—	—	1
9. Teachers	59	7	7	73	172	17	13	202
10. Authors, editors, journalists, shorthand writers, scientists, painters, and sculptors	23	2	1	26	1	—	—	1
11. Photographers, musicians, actors	38	3	1	42	33	3	1	37
12. Merchants	5	1	2	8	—	—	—	—
13. Brokers, auctioneers, accountants	64	7	5	76	2	—	—	2
14. Salesmen and commercial travellers	66	10	4	80	1	—	1	2
15. Company officers	2	—	—	2	—	—	—	—
16. Commercial and industrial clerks	308	38	19	365	56	16	3	75
17. Bankers and finance	31	5	3	39	—	—	—	—
18. Insurance clerks	21	2	1	24	—	—	—	—
19. ,, agents	34	3	1	38	—	—	—	—
20. Farmers	203	46	328	577	21	8	71	100
21. Other agricultural employers	8	1	—	9	—	—	—	—
22. Merchant service, officers	—	—	—	36	—	—	—	—
23. Railway clerks	68	8	3	79	—	—	—	—
24. Telephone clerks	14	2	—	16	9	2	—	11
Manufacture and occupations not otherwise included—								
25. Employers	225	32	9	246	23	3	1	27
26. Working on own account	269	13	4	286	241	29	8	278
Dealers and shopkeepers—								
27. Employers	133	20	16	169	14	2	2	18
28. On own account	218	15	13	246	90	13	11	114
29. Employed	469	62	49	580	161	37	31	229
30. Costermongers and assistants	47	4	2	53	14	3	1	18
31. Sweeps (not assistants)	4	1	1	6	—	—	—	—
Totals	2,529	313	497	3,375	864	135	146	1,145

The inclusion of heading 30 and 31, and the further inclusion of gardeners working on their own account (26,000), and of showmen, &c. (15,000), and of "missionaries, preachers, monks, sisters, &c.," are open to question. An estimate for some of these is included in our final table.

The table just given classifies the persons returned as occupied in the census of 1901 in thirty-one classes. The classes contain in every case one or more of the census sub-headings. These sub-headings are grouped in an apparently arbitrary manner in accordance with the kind of information as to incomes which is available. The classification for England and Wales in the census is the same as that for Scotland, but that for Ireland differs in some important respects, and some approximation has been necessary to obtain correspondence. The list will only be completely intelligible when put alongside the census tables of occupation. Since this classification is extremely important, in order that our results may be understood, and be capable of improvement as further information accumulates or as the census classification becomes more useful, we give the actual sub-headings contained in our thirty-one classes. Those who are not so included are lumped together as manual workers.

The first eleven classes are included under the census headings—Government, Defence, Professional.

Class.
1 Civil Service, officers and clerks.
2 Municipal, parish, and other local or county officers.
3 Army officers (effective and retired).
4 Naval officers (effective and retired).
5 Clergy and ministers of all denominations.
5*a* Missionaries, preachers, monks, &c.
6 Barristers and solicitors.
7 Law clerks.
8 Those professions for which definite preparation is required, *i.e.*, doctors, dentists, veterinary surgeons, engineers, surveyors, and architects. Nurses are not included.
9 Teachers.
10 A composite group of authors, editors, journalists, reporters, shorthand writers, persons engaged in scientific pursuits, and artists, as to whom we have no special information.
11 A similar group, where there is a larger proportion of semi-manual workers included—photographers, musicians, and actors.

The following eight groups are included under commercial occupations in the census:—

12 Merchants.
13 Brokers, stockbrokers, agents, factors, accountants, auctioneers, house agents. A miscellaneous group concerning whom we have no special information.
14 Commercial travellers and a few salesmen and buyers not otherwise described.
15 A small group described as officers of companies, societies, &c.
16 Clerks. Under this heading are included according to the instructions to the Census clerks employed in classifying occupations (of which we have a copy) the following headings:—

Accountant (bookkeeper), accountant clerk, accountant's clerk, booker, bookkeeper, cashier, managing clerk, secretary (not private) other than bank, insurance, and others specifically included in other classes. Collector of accounts, debts, rents, or rates, &c., water clerk, autotype worker, merchant's correspondent, phonograph writer, typist, copyist, shorthand clerk, and some others.

We learn that it was intended to include all clerks, whether in commerce or manufacturing industry, under this heading.

17 Bankers and finance agents.
18 Insurance clerks.
19 Insurance agents and collectors.

The remaining classes are:—

20 Farmers and graziers.
This includes crofters in Scotland and peasant proprietors in Ireland. It does not include farmers' relatives working on the farm or bailiffs.

21 Here are included a number of gardeners, entering themselves as employers and proprietors of agricultural machines, &c.

22 Here we have included masters, mates, and an estimate for engineers (from Table 52 of Appendix A to the General Report of the Census). It is to be noticed that seamen at sea are not always included in the total population.

23 Railway officials or clerks. This is not given in the Irish census, and we have approximated for the relatively small number there concerned.

24 Telegraph, telephone service, not including messengers or Government servants who come under Class 1, or mechanics.

The next five classes are obtained from Orders 9 to 22 in the census clsssification, which contain the whole of productive industry and a great part of retail distribution. The first separation is between manufacturers (or makers) and dealers, which includes shopkeepers and assistants. This division is not made in the Irish census, except that most important classes of shops are given separately. It is not possible in general to distinguish between wholesale and retail distribution, but it is to be remembered that clerks, who are the main employés other than manual workers in wholesale distribution, are already included in our Class 16.

The other line of division is between employers, those who are working for employers, and those who are working on their own account. In the general report in the 1901 census considerable dissatisfaction is expressed as to the result of this classification, but it may be observed that it appears to be correct in its main lines, since persons working on their own account are found in greatest numbers in precisely those occupations where common observation would lead one to expect them. (See the list in the table below.) There is no other means of estimating these numbers. It is quite possible that many persons describe themselves as employers who are, in fact, employed during part of their time, and, indeed, very many persons are both employers and employed. To this point we must return when we estimate the incomes of this group.

In Class 25 are included all the persons returned as employers in the census orders, except those employers who are dealers or shopkeepers, who, together, form heading 27. Similarly, under 26 and 28 are included those working on their own account. In Class 29 come those (other than clerks) who work for those employers who are dealers or shopkeepers. Finally, we include Class 30—costermongers, whether employers, employed, or on their own account—and Class 31—employer sweeps; for these two classes, presumably, are not included in the Labour Department's wage statistics, as they are not manual workers employed by others. We may here remark that we learn that shop assistants are not to be included in the current wage census, and we have therefore included them in the intermediate group.

A study of the census will show some other classes, all small, which might be included in our grouping, but even in the aggregate they will not be large enough to affect our estimate seriously, and may be left as part of the margin which may be included either in the intermediate group or the wage-earning group, and must be included in one or the other. Additional classes, however, 5*a* (missionaries, &c.) and 11*a* (showmen, &c.), are inserted in a further table (page 63).

It must be remembered that the whole estimate is dependent on the census classification, that is, ultimately, on the occupations which persons returned themselves as following in 1901, and we have no means of going behind this classification, except in those few cases where there are independent statements of the numbers of persons in an occupation, and even then the difficulties of comparison are enormous. In the supplementary table annexed are given some details under our Classes 25 to 29 in order that it may be seen what occupations provide the greatest number under these composite headings:—

Census—Further details.

Classes 25 *and* 26—*Manufacturers, &c., England and Wales.* (000's.)

	Employers.	Working on own account.	
		Men.	Women.
Roads	10	23	—
Rivers and docks	3	4	—
Mines and quarries	1	—	—
Blacksmiths	7	10	—
Metals	16	11	—
Ships	1	1	—
Vehicles	8	8	—
Precious metals	8	13	—
Builders	57	49*	—
Furniture	9	13	—
Wood	2	3	—
Glass	3	1	—
Chemicals, &c.	3	1	—
Leather, &c.	5	5	1
Paper and printing	6	3	—
Cotton	3	—	—
Wool	3	1	—
Other textiles	4	2	5
Clothes	25	57†	183§
Food	7	7	1
Tobacco Beer and spirits	3	—	—
Lodging-house and inn-keepers	16	55‡	47
Others	5	2	4
	205	269	241

* Carpenters, 17; painters, 11; plumbers, 5; builders, 5.

† Tailors, 16; bootmakers, 38.

‡ Coffee-house, 6; lodging-house, 4; publicans, &c., 44.

§ Milliners, 8; tailors, 5; dressmakers, 153; seamstresses, 15.

Classes 27, 28, 29—*Dealers and shopkeepers, England and Wales.* (000's.)

	Employers.		Assistants.		On own account.	
	Males.	Females.	Males.	Females.	Males.	Females.
Dealers	17	—	—	—	—	—
Ironmongers	5	—	20	2	4	1
Jewellers	1	—	3	2	2	1
Chemists	5	—	16	3	4	—
Booksellers and newsagents	6	—	23	10	9	4
Clothiers and hatters	4	—	15	4	3	1
Bootmakers	2	—	10	6	2	1
Haberdashers	1	—	5	1	1	1
Drapers	11	2	47	58	8	7
Hairdressers	4	—	17	12	12	—
Dairymen	3	—	22	3	10	2
Cheesemongers	3	—	9	1	4	3
Butchers	13	1	68	1	23	1
Poulterers	3	—	13	1	11	2
Corn dealers	5	—	7	—	3	—
Confectioners	12	3	5	21	13	12
Greengrocers	5	—	15	5	20	6
Grocers	18	2	100	13	36	27
General Shopkeepers	1	1	9	16	12	11
Pawnbrokers	2	—	8	1	1	—

The following table shows the whole population over 10 years old as it was in 1901 :—

1901—*Persons over* 10 *years old.** (000's.)

	England and Wales.		Scotland.	
	Males.	Females.	Males.	Females.
Included in previous table	2 529	864	313	135
Manual workers	7,628	3,308	1,078	457
Total occupied	10,157	4,172	1,391	592
Unoccupied	1,977	9,018	265	1,199
Total	12,134	13,190	1,656	1,790

	Ireland.		United Kingdom.†		
	Males.	Females.	Males.	Females.	Persons.
Included in previous table	497	146	3,385†	1,145	4,530†
Manual workers	906	401	9,934	4,165	14,099
Total occupied	1,403	547	13,319	5,310	18,629
Unoccupied	344	1,272	2,575	11,488	14,074
Total	1,747	1,818	15,905	16,798	32,703

* Children (if any) under 10 years in Ireland returned as occupied are also included.

† For the United Kingdom the numbers are corrected as far as possible by including estimates for the Army, Navy, and merchant services afloat or abroad, from the General Report of the Census.

Most of our information as to incomes refers to 1909 or 1910. To bring the census table up to the end of 1909 we must add $8\frac{1}{2}$ per cent. in accordance with official estimates. This shows 4,910,000 persons (4,530,000 × 1·085) in either the income tax paying or in the intermediate group, and about 15,300,000 wage earners, male or female. Actually we have assumed that the numbers in Class 20 (farmers) have remained unchanged, and have added about 10 per cent. in the case of all the other classes; this gives a general increase of 8·6 per cent.

Number of income tax payers.

We can approach this part of the problem from two points of view, for we can either estimate the number of taxpayers from the Reports of the Income Tax Commissioners, or estimate the number of taxpayers in each of our thirty-one classes. As regards the first, it is well known that the number of income tax payers cannot be directly found from the Commissioners' Reports, still less can we find the number of persons who pay on so-called "earned income," which alone concerns us at present. It is not proposed to make a new estimate of this number, but we recall the following statistics from Mr. Bowley's evidence to the Committee on Income Tax (H. of C., 365 of 1906, especially page 223). It appears that there were in 1904 about 639,200 persons earning over 160*l.* in Schedules D and E. To this we must add 23,000 farmers (see page 63), making 659,200, and 5 per cent. to bring it up to the year 1909, making 682,000. To this should be added an estimate for the considerable number of persons who earn less than 160*l.*, but whose income from other sources brings them above the exemption limit. On the other hand, we find in the fifty-second Report of the Commissioners (page 139, note) that about 750,000 persons satisfied the Commissioners that they were entitled to pay only 9*d.* on the whole, or some part of their income, *i.e.*, there are at least 750,000 persons who have some earned income and a total income between 160*l.* and 2,000*l.*; to this should be added the relatively small number of persons, part of whose incomes are earned, while the whole is above 2,000*l.*, and also the number who did not, owing to the shortness of notice in 1908, or for other causes, claim the reduced rate to which they were entitled. All these data are consistent with an estimate of 800,000, or rather more, as the number of occupied persons who pay income tax, and we propose to adopt this estimate. If the Income Tax Commissioners give us more information in the future it can readily be used to make the necessary alterations throughout the remainder of our estimates. Subtracting these 800,000 taxpayers from the 4,900,000 occupied persons other than manual workers, we have the large number of 4,100,000 persons in the intermediate group. This is likely to be correct (subject to the definitions we are adopting) within 100,000. This number is considerably greater than those which have been hitherto adopted; but previous writers have not given their data, so that it is not possible to discover the cause of the difference. It is probable that a very large number (nearly 1,000,000) classified as working on their own account in our table have not been included in other estimates, and that some classes which may be regarded as manual labour classes are included in our statements, but not in others. As already stated, this inclusion or exclusion would become unimportant if the aggregate of income, salaries, and wages were computed.

Numbers and incomes in the thirty-one classes of the intermediate group.

We now proceed to discuss the incomes of our thirty-one classes. For some of these we have adequate information; for others we have sufficient information to form an approximate estimate; for others we must proceed by results of common observation or by guesswork. It is intended throughout this part of our Report to show clearly the basis of our estimates, and to put them in such a form that it will be possible for each item to be amended if further information can be obtained. Our information is adequate as regards the Civil Service, Local Government, the Army, Navy, the clergy, elementary teachers, banks, and railway servants. It is sufficient for an estimate for clerks, farmers, and shop assistants. In some other cases, viz., professional, under our Classes 6 and 8, and merchants, we may assume that the great majority pay income tax. In the remaining cases we must do the best we can to find limits to the aggregate income, which will not contradict any of the general data we have. The weak point of previous estimates of this intermediate income has been that no attempt has been made to determine any limits within which the aggregate may be definitely expected to lie. The late Sir Robert Giffen and some other writers have been content to find a lower limit and say, for example, that there is *at least* 200,000,000*l*. in this group. Others following the example of Dudley Baxter, who initiated this inquiry in 1868, have been content to make the best guess they could, without attempting to assign its precision. We propose, on the other hand, to state (wherever any check can be obtained) the superior and inferior limits of the number and of the average income of the non-taxpayers in each group, and hence to compute a measurement of precision of the aggregate.

The theory of probability, especially that part related to the law of great numbers and the normal curve of error, will afford some help. In each case we have endeavoured to assign, in the light of all the information available, whether published in this Report or omitted as too confidential or for want of space, limits within which it seems highly probable that the true measurement must lie. The modulus in the curve of error shows the deviation which will only be exceeded in either direction once in six times in the long run, and we believe that we can assign the numbers, not differing greatly from such a modulus for the various classes. This does not mean that we can assign definite odds of five to one against the quantity measured being outside the limits we give, but that we can obtain numbers whose ratio to such a modulus will not differ greatly from unity. The numbers following the sign ± in our estimates are all to be interpreted in this sense.[1] Having obtained these moduli for all the items it is a known problem to combine them by the theory of error into a modulus for the total. Accordingly this section of the Report will be devoted to assigning estimates for each of the thirty classes, and then grouping them together.[2]

It must be clearly understood that the main purpose in this Report is to tabulate our knowledge or our ignorance as to the intermediate group as definitely as possible, and to assign limits to the precision of the estimate of the *aggregate* income of this group. Every estimate should be criticised in the light of its effect on this aggregate, and if any amendment is thought necessary, its effect on the result should be computed before its importance is accepted. As a bye product we have also obtained valuable information as to special classes, but we are bound to make estimates in all cases whatever our ignorance may be. It is believed that the use of the modulus, chosen so as to include all estimates which are reasonably probable, enables us to make bricks without straw which will be strong enough for the strain we shall put on them.

1. *Civil Service.*—There is no exact classification extant of the individual salaries of Civil servants, but the numbers and the salaries are given in great detail in the estimates for the Civil Services and Revenue Departments published annually. The only difficulty is to interpret such items "39 second division clerks, minimum 70*l.*, annual increment 10*l.*, maximum 250*l.*, total 5,400*l.*," and to estimate from them the number and income of those who have not more than 160*l.* It is believed that this has been done in such a way that the result, both in number and distribution of salaries, is very near the facts, and that it was unnecessary to try to get complete details from the Treasury. The process used is to take every item by itself, and divide the groups according to whatever indications are given. A further difficulty is to divide the wage earners from the salaried, but the Census instructions to Tabulating Clerks make it possible to select with very fair precision those who are included under the heading Officers and Clerks. As a result of our examination we find 56,000 male Civil servants (officers and clerks) in the United Kingdom, of whom about 19,000 received more than 160*l.* The Census total was 52,000, which, when increased by 9 per cent. to bring it up to date, corresponds closely with the total just found. The average salary of these clerks is, approximately, 95*l.* Our conclusion is that there are 36,000 ± 2,000 male clerks, with not more than 160*l.*, and that their average is 95*l.* ± 5*l.* As regards the women clerks, we only find 14,300, whereas the Census gives 18,000. [The difference is not improbably due to many sub-postmistresses returning themselves as Government servants, whereas, in fact, they would be more properly classified as

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[1] We use the modulus here in preference to the "probable error" or the "standard deviation," which express smaller improbabilities.

[2] It should be understood that the estimates in this section of the report have been made by the Secretary, who alone has had access to the information accumulated, and that the other members of the Committee have only given a general assent to them.

shopkeepers, and only receive part of their income from the Government. We have transferred these to Class 27. Sub-postmasters and mistresses are not properly included as Government servants.] The main bulk of these female clerks are in the Post Office service. Only 175, or about 1 per cent., of these women earn more than 160*l.* The estimate we adopt under this heading is 15,000 ± 2,000, at 57*l.* ± 5*l.* In this and in other classes a small number pass the exemption limit in virtue of other sources of income. There is no means of allowing for this except by the limits shown by the "modulus."

2. *Local Government.*—We have received in answer to our schedule of inquiry thirty-one detailed returns from county boroughs in England and Wales with an aggregate population of over 4,000,000, and a return from the London County Council. There is considerable difficulty in definition in this class, and it is improbable that the town clerks who made returns for us obtained exactly the same line of division as the Census authorities, either as to whether a person was or was not employed in Local Government service, or as to whether he was an official or a workman. A further difficulty is that many persons give only part of their time to such service, being engaged in professional occupations otherwise, and that they may in a few cases have been included with unduly small incomes. For Scotland we have returns from Glasgow, Edinburgh, Dundee, Perth, Paisley, Hamilton, and Cupar. We have no returns from counties as apart from boroughs. The total number for which we have information is 11,400 males and 1,560 females in Great Britain. We have no returns from Ireland. As regards males, 38 per cent. in London, 76 per cent. in the boroughs, and 76 per cent. in Scotland received less than 160*l.* The average of these in London was 120*l.*, in the boroughs 91*l.*, in Scotland 93*l.* Taking the Census numbers and combining our estimates in proportion to the population of London, the rest of England, and of Scotland and Ireland, we find that 72 per cent. (*i.e.*, 26,000) receive less than 160*l.*, with an average of 93*l.* Different methods of combination would give different results, and it seems necessary to allow a margin ± 2,000 for the number, and ± 10*l.* for the average salary. As regards women and girls, we find that the proportion to men in our returns is less than in the Census, no doubt because the Census includes nurses in infirmaries, &c., while for our purpose they were excluded, together with other nurses in the Census Order 3, Sub-order 3. We have therefore in the final table included only one woman to seven men, as shown in the returns. Very few of them receive over 160*l.*—their average in London is 80*l.*, in the boroughs 46*l.*, in Scotland 50*l.*, and the approximation chosen is 5,000 ± 3,000 at 50*l.* ± 5*l.*[3]

Note.—It must be remembered that we have to deal with a very large aggregate, and in dealing with items which do not amount to 1,000,000*l.*, as is the case for women and girls in the two classes now dealt with, a considerable relative margin will have little absolute effect on our final estimate.

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[3] The table which shows the estimates adopted is on page 63.

3. Of Army officers, it appears from the Army Estimates that only about 800 receive salaries of less than 160*l*., and their aggregate is 92,000*l*.

4. In the Navy, sub-lieutenants, mates, cadets, clerks, and some others receive less than 160*l*. There are in all 1,475 of these, with an aggregate income of 115,000*l*. In both these cases it is reasonable to assume that retired officers have incomes above 160*l*.

5. *Clergy*.—We have information in considerable detail as to many denominations, but it is not necessary to go into these minutely in view of the smallness of the aggregate non-taxpaying income. In the *Established Church in England and Wales* the net income is less than 160*l*. in about 4,000 benefices, and more in the remaining 10,000. The average salary of 7,200 assistant clergy is estimated to be slightly less than 150*l*. There are some 4,000 clergy, also, not attached to parishes. Of course, many of the clergy with the smaller benefices have independent means. The number we adopt is 7,000 ± 2,000 at 120*l*. ± 20*l*. Ministers of other denominations number about 12,000, of whom we estimate that 7,500 ± 2,000 are not subject to income tax, and average 120*l*. ± 20*l*.

In Scotland there are some 6,000 ministers, of whom about 1,800 belong to the Established Church and 2,000 to the United Free Church. The great majority of the former and over 80 per cent. of the latter have incomes over 160*l*., and so far as we have details of other denominations it appears that similar statements would apply to them. We estimate that there are 1,500 ± 500 clergy with incomes 110*l*. ± 20*l*. below the income tax limit. We have very little information as regards the salaries or receipts in Ireland, where there are some 3,500 Roman Catholic Priests (of whom 1,100 are parish priests) and 2,500 ministers of other denominations. The greatest possible estimate, if all these were receiving exactly 160*l*., would be 960,000*l*., and the sum we need must be between this and nothing. It seems reasonable to take 3,000 ± 2,000 at 110*l*. ± 30*l*. The clergy in the United Kingdom then are estimated to contribute about 2,500,000*l*. to our total, and it is unlikely that it can be as much as 3,500,000*l*., or as little as 1,500,000*l*.

Class 5*a* contains monks, nurses, sisters, itinerant preachers, many of whom have no definite income. We include an estimate in the table which indicates that the aggregate is quite small.

Class 6. *Lawyers*.—In this and some of the following classes some assistance is afforded by the distribution by age given in the census. Though, of course, different persons going through a professional career arrive at an income of 160*l*. at different ages, yet there must be an average age at or near which a considerable proportion of such persons obtain an income of 160*l*., and so far as we can assign this average we can assign the number who have less than 160*l*. In the case of barristers and solicitors we take this age to be 28 years, with margin of two years, and obtain 2,000 persons ± 1,000 persons not paying tax. We have no knowledge as to their income, but may put it as 100*l*. ± 50*l*. The total amount is small.

Class 7. *Law clerks*.—We put the age at 30 years, with a margin of about four years. This gives us 30,000 ± 4,000. Since 10,000 of these are under 20, and the average income is therefore small, and somewhat smaller than in the Government service, where there are relatively fewer lads, we may take the income as 80*l.* ± 30*l.*

Class 8.—Under this heading are included those classes of professional men other than lawyers who go through a definite course of preparation. There are very few under 20 so given in the census. If we may assume that the average age for first paying income tax is between 25 and 30 years, we should find 19,000 ± 5,000 not paying, and we may perhaps take their income as averaging 120*l.* ± 30*l.*

Class 9. *Teachers.*—As regards the teachers in public elementary schools in England, the returns of the Board of Education for 1908-09 give in great detail the numbers and, except in the case of supplementary, provisional, and pupil teachers, the salaries. We have collected more detailed statistics from the secretaries of the Education Committees of fifteen counties and forty-two of the larger boroughs in England and Wales. The proportion between men and women in our collection is very nearly the same as in the more comprehensive official statistics, and if we assume, as we are justified in doing, that supplementary, provisional, and pupil teachers receive less than 160*l.*, the proportion of those earning over 160*l.* is nearly the same in both sets of statistics both for men and for women. We are therefore justified in using the average of the figures we have found for those earning less than 160*l.* Our conclusion is that of the teachers in the public elementary schools of England and Wales 7,000 men and 2,000 women receive more than 160*l.*, while 30,000 men and 123,000 women receive less than 160*l.*, the averages for these being 100*l.* and 76*l.*

As regards Scotland, we have detailed information only for Glasgow, Edinburgh, Aberdeen, Inverness, Ayr, and Dundee. We have also some official statistics as to salaries and details as to numbers which throw light on the question, and can be used in conjunction with the statistics for these boroughs; but we have to discount them to some extent for the probably lower salaries in the country districts and smaller places. The salaries in Scotland, especially for men, appear to be considerably higher than in England. It appears that there are about 1,500 men in the elementary schools earning over 160*l.*, and 4,500 others, the latter averaging about 120*l.* Very few of the women receive more than 160*l.*, while about 14,000 average 70*l.*

For Ireland we have detailed information in the official report (Cd. 3699) relating to 1906, from which it appears that only a negligible number of men and women receive over 160*l.* in the national schools, while 6,000 men and 7,000 women receive less, the average of men and women together being nearly 100*l.* For compilation we take it that the men average 120*l.* and the women 80*l.*

Putting these figures together for the United Kingdom, we find that in the elementary schools about 9,000 men and 2,000 women receive over 160*l.*, and 41,000 men and 144,000 women less, the averages being 105*l.* and 75*l.* We enter these in our table as a separate class.

There remain 30,000 men and 76,000 women teachers in schools other than elementary, whom we put in Class 9*a*. We have a little information about these, but it is not sufficient to give an exact result. We find, as we might expect, that the proportion both of men and of women in secondary and higher education earning over 160*l.* will be considerably greater than in primary education, except that allowance should be made for a large number of governesses receiving small stipends. In elementary education one man in five receives over 160*l.* We are of opinion that in higher education one man in two or one in three passes this limit, and that the remaining 15,000 to 20,000 average 120*l.* As regards the women we estimate from such returns as to graduate teachers, &c., as exist, that 4 per cent. in higher education, as against 1½ per cent. in elementary, receive over 160*l.*, but that of the remaining 75,000 very many receive quite small salaries, averaging less than in the elementary schools, and we will take the average at 60*l.*

As to Classes 10 and 11 we have no information, and even the definitions are doubtful. Class 10 contains those engaged in literary and scientific pursuits, and artists, and may be estimated to include about 30,000 persons in 1909. Class 11 contains photographers, musicians, and actors, and may be estimated to include 46,000 males and 41,000 females in 1909. We may perhaps assume that in both cases the amount of 160*l.* is reached by men on an average between 25 and 35 years of age, and that the great majority of the women in Class 10 receive less than 160*l.* This gives 11,000 ± 3,000 in Class 10, and we will put their average at 100*l.* ± 40*l.* Similarly we get in Class 11, for the men 20,000 ± 8,000, with an average of 90*l.* ± 40*l.*, and for the women and girls 39,000 ± 2,000, with an average of 70*l.* ± 30*l.*

Class 11*a* includes showmen and others, some of whom are not manual workers employed by others, and we give a rough estimate in the table, page 63.

Class 12.—This small class of 9,000 merchants may be taken as contributing nothing appreciable to our intermediate group.

Class 13. *Brokers.*—Among brokers, auctioneers, and accountants, when clerks are excluded, there can be little doubt that the majority pay income tax. It will probably be safe to take the age corresponding to such payment as 30 years, with a wide margin, and so obtain 13,000 ± 5,000 men at an income of 120*l.* ± 30*l.*, there being relatively few under 20 years old; we have also to include 2,000 women.

Class 14. *Commercial travellers and salesmen.*—From information received from the United Kingdom Commercial Travellers' Association and from the Commercial Travellers' Benevolent Institution, it appears that there are from 30,000 to 50,000 men who satisfy the definition of "a person engaged in representing a manufacturer, merchant, or wholesale house for the purpose of securing orders." Of these it is supposed that about 75 per cent. make over 160*l.* There remain from 60,000 to 40,000 other persons included in the Census as travellers. These are probably engaged in canvassing for retail firms, and for other subordinate purposes, and it is probable that the great majority make well under 160*l.* We may expect that there are from 30,000 to 50,000 in all who make over 160*l.*, but in view of the uncertainty as to this denomination we had better take the margin as ± 15,000, while the number is taken as 52,000. As regards the average income it must be remembered that a very great majority of these are over 20 years, and are in a position superior to that of a shop assistant. We may therefore take their income as 100*l.* ± 30*l.*

In Class 15, *Officers of societies and companies*, we will take it that the great majority have an income-taxpaying income.

Class 16. *Commercial and industrial clerks.*—We have returns which are given in some detail in the tables on pages 53 and 55, from 102 firms carrying on a great variety of businesses scattered through the Kingdom, and of very different sizes. These firms employ about 16,000 male clerks, and about 2,600 girls and women. This number of clerks, and still more the number of firms, seem at first sight ridiculously inadequate for our purposes, in view of the facts that there are over 300,000 employers in our Class 25, a large proportion of whom presumably employ one or more clerks, and there are 480,000 persons to be accounted for under the heading. But it often happens that quite a small sample is sufficient to give a measurement, which, though not exact, at any rate has a precision which can be assigned. In the schedules which were filled up, the employers, except in the case of companies, included themselves as making over 160*l.*, but it seems better to adjust the schedules by subtracting 1 in every case from those receiving over 160*l.*, and then treat them as relating only to clerks and other subordinates. In the small firms this is generally accurate, and in large ones it makes practically no difference to the further argument. When this is done, the proportion of those receiving over 160*l.* to the total number employed is written down in each of the 102 classes. The result is given in the table, page 56. It now appears that the grouping of these proportions shows the kind of regularity which is to be expected when samples are taken at random from a definite group. Instances, in fact, as shown in the table, agree fairly closely with the distribution shown by the normal curve of error. Looked at from this point of view it appears that from 1 in 5 to 1 in 3, on an average, of clerks in this class may be expected to receive over 160*l.* Noticing that in the larger firms the proportion is on the whole smaller, and that when all the firms for which we have returns are massed together the proportion falls to ·21, and aiming at a weighted average since the larger firms have greater importance, we come to the conclusion that the proportion is probably between 1 in 4 and 1 in 5, *i.e.*, between ·20 and ·25. We will widen this margin for safety and say, then, that ·23 ± ·06 of male clerks and similar employés pay income tax, and that therefore ·77 ± ·06 of 406,000 (the whole number in this class), *i.e.*, 312,000 ± 24,000 are below the income tax limit. The average income for those for whom we have returns is 78*l.*, and we assign the margin ± 10*l.*

As regards women, the proportion to men in our returns is nearly the same as shown by the Census. The number who pay income tax is very small, the average income shown is 45*l.* We therefore adopt the number 81,000 at 45*l.* ± 10*l.*

As will be seen from the detailed table, it would be possible to make a carefully weighted average allowing different importance to the different occupations, but after careful consideration it is considered that no greater accuracy would be obtained. Of our 102 returns, 27, 21, and 14 are from the neighbourhoods of Manchester, Birmingham, and London respectively, 10 from the rest of England and Wales, 21 are from Ireland, and 9 from Scotland. London is represented rather in Classes 17 and 18.

17. *Bank Clerks.*—Thanks to the Central Association of Bankers we have obtained detailed information as to about 30 per cent. of the bank clerks of England and Wales. For Scotland we have information as to about 80 per cent., and for Ireland we have a less detailed statement, which is stated on good authority to be typical for the country, and which simply gives the proportions of clerks who receive over 160*l.*, from 100*l.* to 160*l.*, and less than 100*l.* The details, which are summarised on page 56, are highly confidential, and we cannot go into them. They result in the following numbers, which may be regarded as being accurate within the limits stated:—24,000 ± 1,000 at 89*l.* ± 5*l.* This corresponds to the receipt of an income of 160*l.* at the age of 32 years on an average.

Details as to firms employing clerks.

	Receiving		Receiving	
	Over 160*l.*	Under 160*l.*	Over 160*l.*	Under 160*l.*
	Males.		Females.	
Architect	2	3	—	1
Auctioneer	2	4	—	—
Insurance broker	2	1	—	—
Stockbroker	2	2	—	—
Accountants	6	20	—	6
	8	15	—	2
	5	19	—	—
	3	7	—	2
	4	2	—	—
Merchants	10	34	—	3
	26	81	—	17
	25	82	—	2
	55	152	—	—
	36	128	—	—
	17	24	—	1
	12	8	—	5
	13	16	—	—
	3	7	—	2
	4	2	—	—
Coal mines	48	81	—	1
	15	61	—	—

Details as to firms employing clerks—Contd.

	Receiving		Receiving	
	Over 160*l*.	Under 160*l*.	Over 160*l*.	Under 160*l*.
	Males.		Females.	
Precious metals	3	—	—	17
	3	1	—	14
Fancy metal goods	2	4	—	10
Moulders	3	2	—	—
Ironfounders	4	36	—	16
Engineers	51	89	—	16
Iron and steel	17	88	—	—
Engineers	48	189	—	18
Electrical engineers	206	710	—	72
Engineers	9	12	—	4
Machine makers	6	14	—	3
Textile ,,	38	85	—	19
Cycles	18	137	—	86
Metal workers	23	117	—	30
Galvanisers	18	44	—	1
Swords	1	1	—	—
Lead, glass, &c.	62	533	—	100
Brass goods	7	5	—	3
	7	4	—	—
Brass founders	23	36	—	13
Engineers and shipbuilders	12	16	—	2
Electric works	136	403	—	78
	11	18	—	—
Shipowners (ashore)	39	34	—	7
	16	109	—	7
Cotton spinners	5	9	—	10
,, weavers	6	13	—	—
Wool ,,	29	19	1	—
Linen	60	165	—	16
	8	14	—	—
Jute	2	4	—	—
	5	7	—	—
	11	4	—	—
Textile merchants	100	762	—	35
	46	179	—	6
Drapery (clerks)	6	25	1	13
	131	414	8	245
	38	53	9	27
	10	40	—	93
Waterproofing	25	96	—	10
Provision merchants or manufacturers	4	20	—	—
	8	11	—	1
	8	—	1	10
	6	4	—	8
	87	82	—	—
	51	222	3	68
	8	77	—	10
General manufacturers	488	3,510	—	1,241
,, merchants	7	20	—	6
Tobacco	83	85	2	1

Details as to firms employing clerks—Contd.

	Receiving.		Receiving.	
	Over 160*l.*	Under 160*l.*	Over 160*l.*	Under 160*l.*
	Males.		Females.	
Beer and spirits	115	169	—	5
	7	6	—	1
	7	8	—	—
Harbours	26	61	—	—
	26	20	—	—
Printers, &c.	12	72	—	16
Builders	10	8	—	4
Furnishers	1	1	—	—
Gas	27	52	—	1
	8	29	—	—
	1	8	—	—
Warehousemen and packers	55	354	—	33
	232	1,095	—	20
	3	8	—	—
	162	326	—	—
	24	105	—	—
Miscellaneous manufacturing and other firms	5	7	—	3
	8	5	—	1
	6	34	—	1
	1	2	—	—
	9	1	—	1
	3	10	—	—
	4	8	—	—
	5	3	—	4
	7	18	—	—
	243	609	—	135
	25	179	—	—
	9	8	—	2
	9	11	—	1
	4	14	—	—
	14	15	1	—
	2	5	—	6
	5	3	—	4
	3,363	12,524	25	2,586
Insurance companies	60	121	—	5
	6	33	—	4
	944	422	—	392
	5	4	—	—
	31	24	—	—
	4	2	—	1
	1	42	—	26
	35	37	—	8
	369	548	—	30
	29	26	—	5
	1	1	—	1
	2	3	1	2
	9	23	—	—
	2	3	—	—
	89	190	—	23
	32	108	—	—
	1,619	1,585	1	497

Details as to firms employing clerks—Contd.

	Receiving		Receiving	
	Over 160*l.*	Under 160*l.*	Over 160*l.*	Under 160*l.*
	Males.		Females.	
Banks	121	500	—	—
	218	583	—	—
	275	511	—	—
	267	649	—	—
	251	521	—	—
	159	490	—	—
	35	56	—	—
	22	22	—	—
	1,330	1,562	—	—
	311	352	—	—
	179	273	—	—
	59	71	—	—
	312	549	—	—
	118	258	—	—
	74	88	—	—
	160	318	—	—
	55	30	—	—
	1,523	1,246	—	—
	44	65	—	—
	216	311	—	—
	15	35	—	—
	5,744	8,490	—	—
Railways	369	4 189	—	136
	914	8,925	—	27
	724	7,281	1	143
	43	465	—	30
	228	2,800	—	60
	139	2,756	—	74
	23	458	—	11
	2,440	26,874	1	481

If $m + 1$ is number of males receiving over 160*l.* and n is number of males receiving 160*l.* or less, and $p = \frac{m}{m + n}$, the *values of p* for 102 firms are as follows :—

·0	·0	·0	·0	·03	·08				
·10	·11	·11	·12	·12	·12	·13	·13	·13	
·14	·14	·15	·16	·17	·17	·17	·17	·17	
·17	·18	·18	·18	·19					
·20	·20	·20	·20	·20	·20	·20	·22	·22	·22
·22	·23	·23	·23	·23	·24	·24	·25	·25	·25
		·26	·26	·26	·27	·28	·28	·28	·29
·30	·31	·31	·32	·33	·33	·33	·33	·33	·36
·36	·36	·37	·38	·39					
·40	·40	·40	·41	·41	·42	·42	·43	·46	·49
·50	·50	·50	·50	·51	·53	·53	·55	·56	·56
·56	·56	·58	·58						
·60	·60	·60	·67						
·71									
·89									

Median........ ·265 | Unweighted average ·305 | Weighted average ·21

Comparison with normal curve of error.

Modulus c = ·25 ; centre ·265.

		Theory.	Observation.
		1	1
	+ 1·8c		
		2	2
	+ 1·4c		
		5	13
	+ 1·0c		
		12	10
	+ ·6c		
Average		19	17
	+ ·2c		
		23	24
	− ·2c		
		19	27
	− ·6c		
		12	5
	− 1·0c		
		8	4

18. *Insurance clerks.*—We have detailed information, which is summarised on page 55, as to about 10 per cent. of these. Though this is a considerable proportion, yet it has not led to results of great precision, because one or two large companies which have made returns show results divergent from the smaller ones. We adopt for our number 14,000 ± 2,000 at 87*l.* ± 5*l.*

19. *Insurance agents.*—We have no information as to this class, except common observation that they are not highly paid. Of course, they depend mainly on commissions. We take it that rather more than half pay income tax, that, in fact, the number required equals the number over 35 years of age. It results that 19,000 ± 5,000 come within the non-paying class, the largeness of the margin corresponding to the want of information. We may put the earnings at 100*l.* ± 30*l.*

20. *Farmers.*—We do not presume to determine precisely the average income of farmers, a task which has always proved beyond the powers of statisticians, but it is necessary to make some estimate to fit in to our general scheme. After the Commission on Agricultural Depression in 1894, where evidence was given which showed that farmers' profits averaged about 26 per cent. of their rent, it was decided that profits should be assumed to be one-third of rent. We do not feel justified in taking this assumption as representing the average, partly because less than 300 farmers choose the alternative of assessment under Schedule D, depending on their actual profits, and we only use it for estimating the relatively small number of farmers paying income tax, and as a check on further estimates.

In the Reports of the Income Tax Commissioners relating to Schedule B we find the aggregate of farmers' incomes, which, reckoned at one-third of rent, are over 160*l.*, and an aggregate of the rest of farmers' income assessed, but exempted from tax. The first aggregate was 5,000,000 for Great Britain in 1907–8, corresponding to 15,000,000*l.* rent. Besides these figures we have in the return from the Board of Agriculture of 1895 (C. 8502) the number of holdings of various sizes in that year. These two things together lead to an estimate of the average rent per acre, for if more than 1*l.* 12*s.* per acre is assumed, farms of less than 300 acres would pay income tax, and then the acreage of the holdings included would show more than 15,000,000*l.* rent. If, on the other hand, less than 1*l.* 12s. is assumed, the figures fail to be consistent in the opposite direction. Of course the rental from farms of the same size varies enormously, but we speak only of an average. We therefore take it that the average rent per acre is 1*l.* 12*s.*, as reckoned for income tax purposes, in spite of the fact that this is more than was estimated by Mr. Thompson in a paper to the Statistical Society in 1907. There were 20,000 holders in Great Britain of more than 300 acres, and we will take this to be the number who pay income tax. In the case of farmers we are assuming that there has been no increase in numbers since 1901. We have then 258,000, according to the Census classification, not paying income tax. This corresponds to the number of holdings between 20 and 300 acres in which the aggregate is 21,700,000 acres, and the average is about 80 acres. The average rental income, 1*l.* 12*s.* an acre, is 128*l.*, the aggregate 35,000,000*l.* The amount reviewed by the Commissioners and exempted from tax corresponded to a rental of 26,400,000*l.*, which (on the same basis) would accrue from the aggregate of holdings between 50 and 300 acres. Presumably the profits of small holdings are not returned by the tax surveyor. No one will believe that the average income of farmers holding 300 acres and under is as little as 43*l.*, *i.e.*, one-third of the average computed rental. It is just conceivable that the cash income may not be much greater, but in such a case considerable value of the produce grown is consumed at home by the farmer and his family, who are also provided with a house. We shall probably be on safe ground if we take the average income for this group as 60*l.* ± 30*l.*, that is, the average profit per acre is between 7*s.* 6*d.* and 22*s.* 6*d.* The average income does not seem absurdly low, in view of the fact that 86,000 of the farmers have between 20 and 50 acres only. Perhaps part of the profits from the 2,000,000 acres of agricultural land in holdings of from 1 to 20 acres in Great Britain should be added to our final estimate; but much belongs to persons already included, and forms part of their estimated incomes.

If we work out the statistics for Ireland on the same basis as for Great Britain so far as possible, we find that 590,000*l.* pays income tax, and 2,530,000*l.* is exempted. There are 14,700,000 acres cultivated in Ireland. If the whole of this is reviewed by the tax surveyors this gives 1*l.* 12*s.* rent per acre, if some of it is not reviewed it gives more than 1*l.* 12*s.* an acre. We will therefore make an estimate as if the average rent was 1*l.* 12*s.* an acre, as it is in Great Britain. On this assumption 1,200,000 acres, in holdings of 300 acres and over, pays tax, and belongs presumably to between 2,000 and 4,000 persons.[4] The remainder, if we adopt the Census figures, is held by nearly 400,000 persons, and this is nearly equal to the number holding between 5 and 300 acres, the average size of these holdings being 40 acres, which, on the same basis, is yielding somewhat under 21*l.* a year. But, of course, in the small holding of Ireland the peasant lives to a great extent on his produce, and we must put aside these numbers as in the case of England, and make a pure assumption as to their real earnings; we will take it that the Irish peasant averages 30*l.* ± 15*l.* a year, the value of produce sold or consumed from his land, *i.e.*, from 7*s.* 6*d.* to 22*s.* 6*d.* per acre. Where the peasant carries on another occupation the sum named will be purely additional to the amount received from the other occupation, or already accounted for in another class. The cases where the joint income is over 160*l.* may be neglected.

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[4] Less than 4,000 persons, for the average must be under 300 acres; more than 2,000, for the official statistics show 1,544 persons as holding more than 500 acres, while there are nearly 8,000 persons in the group next given as holding from 200 to 500 acres.

21. *Agricultural employers.*—These are partly machine proprietors and the like, but mainly gardeners, nurserymen, seedsmen and florists. In the absence of information we will assume that half of this group of employers pays income tax and the other half does not, but has an income comparable with that of skilled artisans. In any case the aggregate is not great.

22. *Officers of the merchant navy.*—From page 306 of the General Report of the Census of England and Wales in 1901, details are given of the number and ratings of seamen, who should naturally be counted as citizens of the United Kingdom, but are absent for the most part on Census day. The persons that come into our class are the masters, mates, engineers, head stewards and doctors. In the Census the engineers are not separated from firemen. We assume, in accordance with the only detailed return we have, that the number of engineers is slightly greater than the number of mates, and allowing for the increase since 1901 we have 40,000 persons in this class. We have only three returns from shipping companies, one of which gives 312 out of 1,101 officers as receiving over 160*l.*, the second 111 out of 330, and the third 60 out of 720. In the third case there are a very large number of fourth officers and junior engineers receiving less than 60*l.*, and it is very unlikely that this is the proportion in the merchant service as a whole. The first and second returns give nearly the same proportion and nearly the same average under 160*l.* Adopting these two returns as typical, but allowing a wide margin because of the third return, we will take it that 30,000 ± 3,000 receive less than 160*l.*, and average 100*l*, ± 30*l.* In this class, of course, food and room afloat is provided in addition to salary, but in such cases the value received does not rank as income in the definition of the Income-Tax Commissioners, and we do not propose to include in our estimate the value of board and lodging in this and other classes where it is given in addition to salary, though we have included some receipts in kind in the case of farmers who produce for themselves.

23. *Railway clerks.*—We have been very fortunate in obtaining information as to 29,300 railway clerks and officials out of about 83,000 in Great Britain. We have no information as to Ireland. The railways from which we have returns in England and Wales will, it is believed, give nearly the same distribution and average

as all would. Returns for Scotland are more complete, including 6,000 clerks and officials out of about 9,000. In grouping these together we have treated Scotland and England separately, and assumed that the Scotch returns would apply to Ireland, when allowance is made for the different totals in the two countries, and then put them together in proportion to the numbers employed in the three countries. The result is that 9,000 ± 2,000 receive over 160*l.*, and 78,000 ± 2,000 under, and these latter average 82*l.* ± 5*l.*

24.—This class consists almost entirely of telephone and telegraph clerks, other than those employed by the Post Office. We may take it that the run of salaries is somewhat lower than for commercial clerks, and as the whole class is small it is not necessary to aim at great precision. Our estimate is given in the table on p. 63.

In Classes 25 to 29 we deal with all the manufacturers, shopkeepers, and dealers in productive and distributive industry not included in the previous classes, and not costermongers. The great difficulty is the complete lack of information, and also the doubtfulness of the division between persons returning themselves as employers and those returning themselves as working on their own account. In view of the number of commercial clerks which we have already dealt with, it seems quite certain either that the number of employers is inflated or that many employers are on so small a scale that they do not employ a single clerk.

Class 26.—It appears safe to assume that the great majority of those working on their own account, of whom some detail is given in the table on p. 63, are making less than 160*l.* a year. Thus the manufacturers include a great number of blacksmiths, carpenters, tailors, and bootmakers among the men, and of dressmakers among the women. It is safe to assume that these men are making something between the wages of skilled and unskilled men on an average, and we therefore put them at 80*l.* ± 20*l.* Dealing similarly with the women, and allowing a large margin in view of the fact that a great number of badly paid workers may be included, we may put the average as between 20*l.* and 60*l.* These estimates are sufficient for Class 26.

Classes 27 and 28. *Dealers and employer-shopkeepers.*—The 17,000 dealers may be taken as paying income-tax. There are left 194,000 shopkeepers, including here 5,000 transferred from the civil service (see p. 47). The only information we have bearing on shopkeepers is the assessed value of residential shops, and the income-tax surveyors, of whom we have enquired, maintain that the assessed value of a shop has no relation to the income as a shopkeeper, though, in fact, the two or three estimates they reluctantly made were practically identical. It is assumed in the Income-Tax Act that, in the case of a residential shop, one-third of the assessed value should be counted as residence; also, it is generally assumed that rent is from one-eighth to one-tenth of income for incomes of about 150*l.* If we make these two assumptions together, we find that the assessed value of a residential shop, 50*l.*, corresponds to an income of 160*l.*, and it is not improbable that the number of shopkeepers who reside at their shops subject to income-tax is equal to the number of residential shops assessed at 60*l.* or more in London, and 50*l.* or more in other parts of the United Kingdom. In the Fifty-third Report of the Commissioners of the Inland Revenue, p. 93, we have the necessary particulars, except for Ireland. Taking the number for Ireland as equal to that for Scotland (738), we find about 80,000 residential shops in the United Kingdom above the limits of assessment named. To these we should add a small number of non-residential, or "lock-up" shops. We suggest 80,000 ± 30,000 as the number of shopkeepers paying tax. There remain about 230,000 assessed as between 20*l.* and 50*l.* Of these about 114,000 would (from the Census figures) be employers, and 116,000 on their own account, if all employer-shopkeepers had shops assessed at over 20*l.* There would remain about 280,000 on their own account assessed at less than 20*l.* Without depending on this assumption, we will take it that the employer-shopkeepers average between 70*l.* and 150*l.*, and those on their own account between 40*l.* and 140*l.*, for the averages are by assumption under 160*l.*, and these people make a living, and if in Class 27 employ others.

25.—If reference is made to the table showing some detail of the employers in manufacture, &c., it will be seen that many are in quite a small way; in particular, blacksmiths, those producing clothes or food, some builders, some engaged on rivers, and some engaged on roads (a heading which includes small cab proprietors), will easily account for about 30 per cent. of the whole of the class as not paying income-tax. We may suggest 208,000 ± 60,000 as paying, and 93,000 ± 60,000 as not paying tax, and assign to these latter the same income as in Class 27. As regards these very uncertain estimates in Classes 25—28, it must be remembered, as already stated, that we know the total of those paying income-tax approximately, and it is only a question of distributing them among the right classes. If we have taken too many in Class 27 it will follow that we have taken too few in Class 25, and so on. The range of income assigned, for those with less than 160*l.*, is, it is thought, wide enough to cover the uncertainty.

29. *Shop assistants.*—We have three different returns, one covering 15,000 shop assistants, with an average of 61*l.* per annum in cash; one from quite a small group of special firms, covering 1,900 persons, with an average of 68*l.*; and a third—a very important compilation kindly handed to us by the financial secretary of the National Amalgamated Union of Shop Assistants, relating to 3,171 persons, whose average cash income is 74*l.* In the first and third cases something would have to be added, for about 22 per cent. of the assistants in the one group, and 16 per cent. in the other, who live in, or have meals in, if we were including such payments. Further information is given in *Industrial Co-operation*, by Miss C. Webb, 1904, where the range of earnings of the branch managers and countermen in the Co-operative Retail Distributive Societies are given in some detail, relating to over 10,000 employés; the data are not sufficient for a perfect calculation of the average, but it cannot be very far from 68*l.* We have these four different estimates relating to a variety of districts and trades, and all being

contained in the limits, 67*l.* ± 7*l.* Nevertheless, we think that this wage is rather higher than the one we ought to adopt for the 900,000 persons in Class 29, since many of these are probably engaged at very low salaries in shops from which no information was obtained in any of the returns. We, therefore, prefer to take 65*l.* ± 15*l.* as the average annual wage. We have practically no information as to the number of shop assistants who receive over 160*l.*, but it is certainly extremely small, and we take it as about 1 per cent.

30. *Costermongers.*—This class includes all kinds of street sellers and hawkers. Probably none of them pay income-tax. We may divide them as lads under 20, average perhaps 20*l.* a year; men of over 20, receiving somewhat more than the wage of unskilled labour, on an average, say, 70*l.*, with a wide margin; and women at perhaps 30*l.* This gives an average of about 50*l.*, and we will take it as between 40*l.* and 70*l.*

31. *Sweeps* (*employers*).—None need be counted as paying income-tax, and the average may again be taken as between the wages of totally unskilled and of highly skilled labour. We put it at 70*l.* ± 30*l.*

In the table on page 63 the estimates we have now made are tabulated in detail. In the columns 1 and 2 are given the number of persons estimated from the census of 1901 raised by 10 per cent. throughout, except in the case of farmers, whose numbers are left unaltered; including farmers, an increase of 8·6 per cent. is allowed, which is about the increase of the whole population up to the end of 1909. Columns 3 and 4 give the number paying and not paying tax respectively, and column 5 the margin assigned. Column 6 gives the average income of those not paying, column 7 its margin. Column 8 gives the aggregate of the estimates assumed correct.

The total of the numbers we have found subject to income tax is 900,000, while, if all the margins are added together and all taken as positive, they amount to 212,000. Compiled, however, by the theory of error, as explained below, the margin suggested is about 75,000, and is almost entirely due to that of Classes 16, 25, and 27. If the estimate of 800,000 income-tax-payers is correct, we have put rather too many in each of these classes, and they should be transferred to the intermediate class.

It remains to compute the error in the total from the errors in the details. Let n stand for the number of non-taxpayers in each class, c for its modulus—given in thousands, s for the average income in £, and k for its modulus. c and k are to have the meaning discussed above, and to be regarded as measuring that particular distance from the average known as the modulus in mathematical statistics.

Let A_1 be the estimate, and A the true measurement; and let $A_1 = A(1 + e)$.

Let A' be the measurement if A_1 was in defect equal to the modulus in both its factors, so that $A' = A_1$. $\left(1 + \frac{c}{n}\right)\left(1 + \frac{k}{s}\right) = A_1\left(1 + \frac{c}{n} + \frac{k}{s}\right)$ approximately. Then, by the Theory of Error, $e^2 = \left(\frac{c}{n}\right)^2 + \left(\frac{k}{s}\right)^2$

Results.

Col.	1	2	3	4	5	6	7	8	9
	Census numbers up to date.		Paying income tax.	Not paying tax.				Aggregate.	
	Males.	Females		Numbers n.	Modulus c.	Average incomes s	Modulus k.	Amount $A = ns$,	Modulus K.
	000's.					£	£	£00,000's.	
1. Civil service	57	—	21	36	2	95	5	34	3
	—	15	0	15	2	57	5	9	1
2. Local government	36	—	10	26	2	93	10	24	3
	—	5	0	5	3	50	5	2·5	1·5
3. Army	16*	—	*15	1	0	115	0	1	—
4. Navy	6*	—	*4·5	1·5	0	78	0	1	—
5. Clergy	56	—	35	21	4	120	20	26	7
5*a*. Missionaries, &c.	9	15	0	24	2	40	20	10	5
6. Lawyers	31	—	29	2	1	100	50	2	1
7. Law clerks	46	—	16	30	4	80	30	24	10
8. Professions	80	—	61	19	5	120	30	21	8
9. Elementary teachers—									
Male	50	—	9	41	2	105	10	43	5
Female	—	146	2	144	1	75	10	108	14
9*a*. Other teachers—									
Male	30	—	13	17	3	120	20	20	5
Female	—	76	3	73	1	60	20	45	15
10. Authors, &c.	29	1	19	11	3	100	40	11	5
11. Photographers, musicians, &c.	46	—	26	20	8	90	40	18	11
	—	41	2	39	2	60	30	23	11
11*a*. Showmen	3	—	0	3	2	80	40	2	2
12. Merchants	9	—	9	0	0	—	—	—	—
13. Brokers, &c.	84	2	71	15	5	120	30	18	7
14. Travellers	88	2	38	52	15	100	30	50	22
15. Officials	2	—	2	0	0	—	—	—	—
16. Clerks	401	—	93	308	24	78	10	240	36
	—	82	1	81	0	45	10	36	8
17. Bankers	43	—	19	24	1	89	5	21	1
18. Insurance clerks	26	—	12	14	2	87	5	12	2
19. Insurance agents	42	—	23	19	5	100	30	19	8
20. Farmers—									
Great Britain	249	29	20	258	5	70	30	202	77
Ireland	328	71	3	396	1	30	15	119	59
21. Agricultural employers	10	—	5	5	3	90	40	5	3
22. Merchant service	40	—	10	30	3	100	30	30	10
23. Railways	87	—	9	78	2	82	5	64	4
24. Telephones	18	—	4	14	2	70	20	9	3
	—	12	0	12	0	50	10	6	1
25. Other employers	271	30	208	93	60	110	40	102	76
26. Ditto, own account	315	—	0	315	0	80	20	252	63
	—	306	0	306	0	40	20	122	61
27. Dealers	17	—	17	0	0	—	—	—	—
Shopkeepers: employers	169	25	80	144	30	110	40	125	46
28. Ditto, own account	271	125	0	396	0	90	50	356	198
29. Ditto, assistants	638	252	10	880	5	65	15	578	132
30. Costermongers, &c.	58	20	0	78	0	65	15	51	12
31. Sweeps	7	—	0	7	0	70	30	5	0
Total and results	3,668*	1,255	900*	4,023	75	71	—	2,847	294†

* There should be added some numbers to allow for the income-tax paying officers afloat or abroad in 1901, perhaps 10,000 to 15,000 for the Army and Navy jointly.

† Viz.. 284,700,000*l*. ± 29,400,000*l*.

The moduli are compounded by adding squares and taking the square root of the sum. $(100K)^2 = c^2s^2 + n^2k^2$.

approximately, and $A_1 = A + \sqrt{[c^2s^2 + k^2n^2]}$ approximately $= A + K'$. Then K' is the modulus for the product.

In the table, K is taken as $\frac{K'}{100}$, to correspond with the units used, and is worked out for each class and sub-class separately.

To get the modulus for the aggregate, we have by a known principle to add the squares of the moduli of the items and take the square root of the sum. If C is this final modulus,
$C^2 = \Sigma(K^2) = \Sigma(c^2s^2 + k^2n^2) = \Sigma(c^2s^2) + \Sigma(k^2n^2) = 6{,}300 + 80{,}000 = 86{,}300$ and $C = 294$, viz., 29,400,000*l.*

The first term is due to the margin (c) in numbers, the second to the margin (k) in income. The second term of itself would give $C = 283$; in fact, the errors in numbers are not important, and we need not therefore discuss the effect that our approximate knowledge of the total number in the group has on the accuracy of the result.

We thus arrive at the conclusion that the aggregate *earned* income in the intermediate group is 285,000,000*l.*, with modulus 30,000,000*l.*, using round numbers. This is subject to the definitions and limitations of the income dealt with as stated throughout the report, and is conditioned by the accuracy of the occupational returns in the census.

If classes 20, 25, 26, 27, 28, and 29 are excluded, the margin in the aggregate of the remaining classes is small, the result for Classes 1 to 19, 21 to 24, 30, 31 being:—

Number of persons, 1,263,000; modulus, 33,000. Aggregate income, 108,700,000*l.*; modulus, 5,700,000*l.*

Unearned income.

Estimates for this can only be satisfactorily made by the authorities of Somerset House, but we have endeavoured to interpret the tables given in the Reports of the Income Tax Commissioners.[5] It appears that 45,000,000*l.* under Schedules A, C, and D is "unearned" income belonging to persons with less than 160*l.* a year from all sources. Of this, the tax on 18,000,000*l.* is collected from and repaid to about 340,000 persons, and the tax on the remaining 27,000,000*l.* is exempted and not paid; this last sum not improbably belongs to about 300,000 persons. Whatever the numbers of persons, we have here the sum of 45,000,000*l.* accruing as unearned incomes to persons, occupied or unoccupied, who have less than 160*l.* a year. In addition, there is a relatively small sum of interests, pensions, &c., which does not come under the cognisance of the Department, which has been estimated as not more than 5,000,000*l.* An unknown part of these sums, however, belongs to the wage-earning class.

Putting these estimates in conjunction with our last, and increasing the modulus to allow for the additional uncertainty, we reach the conclusion that *the intermediate group contains* 4,000,000 *to*

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[5] We have had access to some details not published in the reports, which have enabled us to split up the tables; but the estimates based on them are not authoritative.

4,100,000 *persons with an aggregate income, together with a relatively small sum of "unearned" income belonging to the wage earners, from all sources between* 300,000,000*l.* *and* 370,000,000*l.* *a year.* The most probable estimate is 335,000,000*l.*, and (subject to the definitions we have used) it is distinctly improbable that the aggregate is outside the limits stated.

Distribution of income by amount.

It is not possible to distribute the 4,000,000 persons in our intermediate class according to their incomes, for it is only in Classes 1, 2, 9, 16, 17, 18, and 23 that we have any information, and these between them only amount to 19 per cent. of the whole. The table on page 66 shows the distribution for these various groups and the weighted result when the groups receive importance according to their numbers. There is nothing improbable in the distribution shown, the large percentage under 40*l.* shows that we have included an adequate number of boys and girls.

Recommendations.

The whole calculation will need to be amended when we have the results of the Census of 1911. It is greatly to be desired that the Irish Census should be harmonised with that of England and Wales in its sub-divisions, and that the distinction between makers and dealers, and between employers, employed, and those working on their own account should be made,

For the whole of the United Kingdom it would be a great improvement if clerks were given, in an additional tabulation, according to the main occupations to which they were attached, and if wholesale dealers were separated from shopkeepers.

The work would be more definite if the labour department, working with the Census office, published an estimate of the number of persons who might be considered as manual workers, heading by heading from the Census.

The Inland Revenue Commissioners have a great deal of information unpublished and possibly untabulated. The 53rd report has, unfortunately, not repeated the important table on page 138 of the 52nd, showing the *amount* of income taxed at 9*d.*; as to the *numbers* we find still only the statement in a footnote, that the 9*d.* rate was allowed to approximately three-quarters of a million persons annually. It is greatly to be desired that the Commissioners should publish detailed information, showing the total number of persons who pay the lower rate, the numbers in relation to the amount of earned income, and the numbers in relation to the amount of income whether earned or unearned.

[The Secretary of the Committee will be glad if Fellows of the Royal Statistical Society or others will send him any information as to the matters dealt with in the above report. If any material facts come to light an amended report will be issued next year.]

Distribution and average of incomes under 160l.

	Men and lads.								Women and Girls.								Weights.	
	Percentages.								Percentages.									
	40*l.* or under	Over 40*l.* and not over 60*l.*	Over 60*l.* and not over 80*l.*	Over 80*l.* and not over 100*l.*	Over 100*l.* and not over 120*l.*	Over 120*l.* and not over 140*l.*	Over 140*l.* and not over 160*l.*	Average.	40*l.* or under	Over 40*l.* and not over 60*l.*	Over 60*l.* and not over 80*l.*	Over 80*l.* and not over 100*l.*	Over 100*l.* and not over 120*l.*	Over 120*l.* and not over 140*l.*	Over 140*l.* and not over 160*l.*	Average.	Men and lads.	Women and girls.
Teachers—								£								£		
14 counties, England and Wales	13	6	13	12	22	22	12	96	32	35	12	15	5	1	—	55	4	10
41 boroughs, England and Wales	13	5	9	16	18	17	22	102	11	21	23	23	13	6	3	76	4	10
Scottish burghs	2	2	4	16	25	24	28	130	3	4	22	32	24	12	3	102	1	1
Bankers	14	13	13	14	14	14	18	90	—	—	—	—	—	—	—	—	4	—
Insurance	21	18	12	12	15	10	12	85	13	31	46	7	3	—	—	61	2	1
Railways	10	13	26	22	15	8	6	80	—	—	—	—	—	—	—	—	8	—
Other commercial and industrial clerks	18	13	21	19	14	8	7	80	51	32	11	3	2	1	—	About £40	35	7
Local government—																		
London	0	1	1	17	28	23	30	120	0	7	26	54	7	3	3	86	1	1
30 English and Welsh boroughs	13	9	16	18	19	13	12	91	53	26	9	5	3	3	1	About £48	1	1
7 Scotch burghs	9	8	13	17	24	15	14	93	37	32	22	3	3	1	2	50	1	—
Central government—																		
England and Wales	8	14	14	17	17	17	13	95	27	29	26	10	4	3	1	60	5	2
Scotland	8	15	15	23	17	16	6	90	—	—	—	—	—	—	—	—	1	—
Ireland	10	13	16	21	18	14	8	89	—	—	—	—	—	—	—	—	1	—
	14	12	18	18	16	12	10	87	28	28	18	15	7	3	1	61	—	—

II.—*The International Conference on Unemployment*, 1910.

An international conference on unemployment was held at Paris in September last. A previous open conference was held in Milan in 1906, but the tendency of speakers to diverge from the immediate problem into general theories of social reconstruction rendered the proceedings somewhat ineffective. To prevent the recurrence of such a tendency at Paris, the conference of 1910 was restricted to persons practically interested in the question. Committees were formed in each country, and these committees were asked to send invitations to qualified persons. A committee was formed for the United Kingdom, with Lord George Hamilton as president, Mr. Seebohm Rowntree as chairman, and Mr. J. R. Brooke as secretary.

Each national committee was asked to arrange that reports should be prepared for the conference by competent persons, the reports to deal with (*a*) the general conditions of unemployment, (*b*) statistics of unemployment, (*c*) labour exchanges, and (*d*) insurance against unemployment in the country. For the United Kingdom, papers were prepared by Professor Pigou on "The Problem of Involuntary Idleness," by Mr. N. B. Dearle, on "English Statistics of Unemployment," and the work of the national labour exchanges was authoritatively described in a paper by Mr. W. H. Beveridge, the Director of the exchanges. Nearly fifty reports were presented to the conference from the several countries, besides a number of special contributions, including two interesting papers presented on behalf of the German independent trade unions (Gewerkschaften) on labour exchanges and insurance against unemployment. Reports came from nearly every European country and from the United States of America and the Argentine Republic, and they constitute an interesting and valuable series of documents.

The conference was held at the Sorbonne and was very well attended, official representatives being present from eighteen countries. A large proportion of the persons who attended are actively engaged in the administration of institutions dealing with the problems which were considered. Discussion was restricted to (1) statistics, (2) labour exchanges, (3) insurance against unemployment, and (4) the formation of an international association for dealing with the problems of unemployment. The subjects, except the last, were much too general for close discussion in the short time at the disposal of the conference, and the treatment of each question was wide rather than deep. At future conferences arrangements will no doubt be made for confining the discussion within narrower limits; still the main value of such conferences will generally lie in the well-considered reports which they beget, and in the informal interchange of opinion for which they afford opportunity, and in this respect those responsible for the Paris conference have every reason to congratulate themselves on their success.

The following is a brief statement of some of the principal matters brought out at the conference.[1]

Statistics of unemployment.—The inadequacy of statistics of unemployment was generally deplored. Trade union figures apply only to a section, sometimes small, of the community, and are not always trustworthy. The statistics of labour exchanges, however, like those furnished by trade unions, provide valuable indications, especially where the labour exchange is well-developed, but these also give only partial information, and the statistics of the various exchanges are not uniform. Particulars of unemployment in census returns yield useful information, but generally only show the number unemployed on a particular day, and the returns are not always correctly filled up, unemployment due to sickness or partial invalidity, for instance, being confused with unemployment due to want of work. Relief statistics, such as those of our English distress committees, obviously give only a very one-sided view of unemployment. Special counts, *e.g.*, those undertaken at Berlin, are apt to be biassed if carried out by the workmen's own organisations, and incomplete if the notification of unemployment is voluntary, whether carried out by the workmen's organisations or by the municipality. No doubt fairly complete and accurate figures would be obtained by a house to house enumeration by trained investigators, but such a system would be costly.

The difficulties of obtaining accurate and extensive statistics are certainly great, and it was even suggested that notification of unemployment should be made compulsory, like notification of death; but it seemed to be the general opinion that reliance must be placed on the existing methods, improving and extending these as far as possible, and supplementing general information as to the amount of unemployment by special detailed inquiries on occasions.

It was generally felt that there was need of more uniformity in the statistics of unemployment, so as to render comparison readier. This raised the question of definition, on which there was much discussion, for it was considered that a proper definition was not only a necessary condition of uniformity in statistics, but also that insurance against unemployment could scarcely be held to be practicable unless it could be said with some precision what was meant by unemployment.

It was recognised that there were many difficulties connected with a precise definition, for unemployment is a relative, not an absolute, condition—a man generally being unemployed, not, for instance, because he cannot secure any work at all, but because he cannot secure it on terms which he is prepared to accept. But it was pointed out that however great the difficulties of definition in theory, in practice they did not stand much in the way, as proved by the experience of unemployment insurance schemes already in operation.

Labour Exchanges.—Insistence was placed on the view that a labour exchange should be regarded as an institution for general social welfare, and should not be run for private profit or in the sectional interests of any one party, whether employer or employed. The consensus of opinion was that an exchange should be managed by a joint committee, composed of an equal number of representatives of employers and of employed, with an impartial chairman, and that the expenses of management should be borne by the public authorities.

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[1] An official account of the proceedings of the conference will be published in due course.

Exchanges of this kind are now very general in Germany, and they exist also in other countries. Even in Germany trade unions would like to have their own labour exchanges, but they recognise that they would have to meet the opposition of the employer, and are prepared to acquiesce in the jointly managed exchanges.

On the continent the exchanges are generally under independent local management. The problem of linking up the various exchanges so that they shall work in co-operation is therefore one of importance, and in Germany there are local associations and a national association for effecting this. England escapes these problems by organising the exchanges on a national basis.

International co-operation is of importance to some of the exchanges in border towns, and something has already been achieved in this direction. Thus, the labour exchange at Strassburg, for instance, is in systematic communication, not only with exchanges in some of the German States, but also with exchanges in Switzerland and in Luxembourg. It was suggested that more should be effected in the direction of international co-operation, but it was pointed out that there were many difficulties in the way—difficulties of language, habits, wages, &c.

Insurance against unemployment.—There was much discussion whether insurance should be compulsory. While some speakers advocated immediate compulsion, several expressed the opinion that compulsory insurance was not practicable at the present time, and that it was preferable to be content with financially assisting and encouraging voluntary insurance. The advocates of compulsory insurance especially insisted on the duty of the employer to contribute towards the expenses of provision against unemployment.

Another matter of contention was the position of trade unions in relation to insurance. The case for trade unions was warmly put forward by some representatives of French and German trade unions present at the conference. Attention was drawn to what had already been done by trade unions in the way of insurance, and it was urged that insurance could be effectively carried out only through them. A German trade unionist complained somewhat bitterly of the attitude of the German Imperial Government, which he stated was unwilling to render financial assistance to insurance against unemployment effected through the trade unions, because of its hostility to the latter. The importance of making use of the trade unions appears to have been generally recognised among the members of the conference.

Another matter touching insurance which was discussed was that of the means of checking unemployment. Emphasis was laid on the need of proper definition. The advantage of a well-developed labour exchange was also urged.

International Association.—The most important practical piece of work done by the conference was in connection with this question. A meeting of members of the various national committees was held on the day preceding the formal opening of the conference, and a committee was appointed to consider the question of forming an international association for dealing with the problems of unemployment. This committee presented a report, in which the formation of such an association was recommended. The recommendation was unanimously adopted by the conference, and a committee comprising representatives of different countries was formed for carrying on the work. For the present, four representatives are allowed to the United Kingdom. It is intended that ultimately each country shall have one representative for the first ten members of the association in the country, and an additional representative for every additional twenty-five members, not exceeding seven representatives in all. The membership subscription is 10 francs, and it is hoped to form a strong English branch. Steps have already been taken in this direction.[2] The object of the international association is to afford means for the interchange of opinion by conferences and otherwise between persons in the different countries interested in the problems of unemployment, to collect information and to stimulate researches respecting unemployment, to be a centre of information on the question, and to be a means of co-ordinating the work in the different countries and to secure uniformity of statistics. There is undoubtedly ample scope for such an association. The problem is international, and it demands an international organisation for its study. The association should have a great future, and should rank with the international associations dealing with social insurance and with labour legislation, through which so much has been accomplished. The problems with which it will deal touches the work of these societies at many points, and it has been arranged that there shall be close co-operation between the three associations. The new society is fortunate in its officers. M. Leon Bourgeois, who presided at the Paris conference, has been chosen as its first president, while M. Louis Varlez, of Ghent, has been chosen as honorary general secretary, and M. Max Lazard, of Paris, as honorary assistant general secretary. M. Louis Varlez is one of the foremost authorities in Europe on the question of unemployment. He is the originator of the Ghent system for assisting insurance against unemployment, and no man has come into closer touch with the different phases of the question. To him and to M. Max Lazard are largely due the success achieved by the Paris conference, and under their unflagging direction there is little doubt that this latest of international associations will soon justify its existence, and will do much to throw more light on one of the most difficult of modern problems.

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[2] Information respecting the matter may be obtained from Mr. J. R. Brooke, 3, Clements Inn, W.C.

III.—*Old Age Pensions in the United Kingdom.*

A RECENT Report issued by the Postmaster-General shows the number and value of the old age pensions in force and paid in the several divisions of the United Kingdom during the first three months of 1909, and during the year ending March 31 last. These figures possess considerable statistical interest in connection with the estimated numbers of persons aged upwards of 70 years in each of those separate divisions, and with the relative numbers of pensions paid.

In order to appreciate the true import of this official return it is necessary, in the first place, to estimate on the basis of census returns the number of persons aged upwards of 70 years in the several divisions of the United Kingdom. Such estimates are necessarily based on the assumption that the proportion of the several populations living at those ages is now the same as those which prevailed at the last census, in 1901. That this is a probably sound hypothesis is supported by the fact that the proportion in England and Wales of persons aged 70 years and upwards, to the total population at all ages was practically almost identical at each of the four censuses in 1871—1901. In Ireland, moreover, the proportion to total population of persons aged over 70 in 1901 was very slightly below that which prevailed at each of the two previous censuses in 1881 and 1891.

The following table shows the Registrar-General's estimate of the population of each division of the United Kingdom in the middle of this year; the percentage of the several populations aged upwards of 70 years at the last census, in 1901; the estimated numbers of these populations now living at these ages; the respective numbers of old age pensions in force on March 31 last; and the relative percentage of pensions to the estimated numbers of persons aged 70 years and upwards in each division of the United Kingdom:—

Division of the United Kingdom.	Estimated population in middle of 1910.	Percentage of persons aged 70 years and upwards enumerated in 1901.	Estimated number of persons aged upwards of 70 years in middle of 1910.	Old age pensions in force on March 31, 1910.	Percentage of pensions to estimated persons aged over 70.
England and Wales	36,169,150	2·73	987,416	441,489	44·7
Scotland	4,929,251	2 90	142,918	76,889	53·8
Ireland	4,371,133	4·20	183,588	180,974	98·6

From the above table it appears that 45 per cent. of the persons aged upwards of 70 years were in receipt of old age pensions in England and Wales on March 31 last; and that in Scotland the proportion was 54 per cent. These percentages may probably be accepted as approximately indicating the relative poverty of the population of England and Wales and of Scotland. With regard to the fact that in Ireland very nearly 99 per cent. of the estimated number of persons aged upwards of 70 years were on March 31 last in receipt of old age pensions, it seems more than difficult to accept the same explanation.

It is scarcely necessary to point out that under the provisions of the Old Age Pension Act (1908) either receipt of poor-law relief after the first day of January, 1908, or the possession of "yearly means" exceeding 31*l.* 10*s.* was declared a disqualification for the receipt of an old age pension. No satisfactory basis exists for estimating the proportion of persons over 70 years of age, in the three divisions of the United Kingdom, possessing "yearly means" exceeding 31*l.* 10*s.* As regards, however, the proportion of persons aged over 70 years in receipt of poor law relief, Local Government Board returns afford what may be accepted as trustworthy information. Mr. Charles Booth's valuable pamphlet on "Old Age Pensions and the Aged Poor" contains a useful table based, in 1899, on a "twelve months' count," showing that in England and Wales no less than 35·5 per cent. of the population aged upwards of 70 years were in receipt of poor law relief, including 19·4 per cent. in receipt of in-door and 26·1 per cent. of out-door relief. It may therefore fairly be assumed that at least one-third of the population at these ages in England and Wales are at present disqualified for pensions by receipt of poor law relief since January 1, 1908. The proportion of poor law relief to population at all ages varies but slightly in the several divisions of the United Kingdom, and although no information similar to that compiled for England and Wales by Mr. Charles Booth is available, it may fairly be assumed that at least a third of the persons aged over 70 years in both Scotland and Ireland have received poor law relief since the beginning of 1908. Deducting, therefore, this third from the estimated numbers of persons now living at these ages, it may be calculated that of the remaining two-thirds 67 per cent. in England and Wales and 81 per cent. in Scotland were in receipt of old age pensions on March 31 last. Thus it appears that, apart from relief disqualifications, 33 per cent. of persons aged upwards of 70 years in England and Wales and 19 per cent. in Scotland are not in receipt of pensions, owing probably, in the main, to the possession of "yearly means" exceeding 31*l.* 10*s.* In Ireland, however, the number of old age pensioners at the end of last March exceeded by 48 per cent. the total estimated population aged over 70 years, after deduction of the third presumed to have received poor-law relief since January 1, 1908, and without any deduction for those possessed of "yearly means" exceeding 31*l.* 10*s.* This startling excess of old age pensioners in Ireland may be due (1) partly to overstatement of age; (2) partly to disregard of disqualification by receipt of poor-law relief; and (3) partly by understatement of "yearly means." The marked excess of pensions allotted in Ireland attracted considerable notice in Parliament and in the press last year, and a special inquiry was ordered, with a view to the withdrawal of unauthorised pensions. No report on the result of this inquiry appears, however, to have been published, and it is not without interest to note that the amount paid for old age pensions in Ireland during the year ending with March last was 2,321,729*l.*, which exceeded by 106,225*l.* four times the amount paid during the first quarter of 1909, and was considerably more than double the amount paid during the year ending March 31 last in Scotland, the total population of which is estimated to exceed that of Ireland by more than half a million. A report of the result of the above mentioned official inquiry concerning the marked excess of old age pensions in Ireland compared with those in the other divisions of the United Kingdom, would be full of interest from a statistical point of view. N.A.H.

IV.—*Population and Costs in Relation to City Management.*

By C. Ashmore Baker.

Whilst preparing the figures given in a recently published volume of tables relating to municipal money matters,[1] it occurred to the writer that it might be of interest to ascertain if anything in the way of a direct relation exists between population and the cost of City management. This inquiry is of particular interest at the present time in view of the movement which is taking place in several of our larger cities towards the absorption of their smaller immediate neighbours. Apart from any advantages to be derived from uniformity of administration, which may be claimed for such a policy, the question of cost is an important one, and it has frequently been claimed that the aggregation of administrative areas tends to a general reduction in administrative costs.

A comparison of the averages for the four groups of towns into which the tables are divided indicates, as a matter of fact, with some exceptions, a slight general *increase* in the cost of any given service *per head of population* as the sizes of the towns increase. The most striking feature shown by a comparison of the figures is, however, the extremely small influence which the mere population of a town exerts on the *per capita* cost of its public services. Thus the cost per head for education for the group of urban district councils, which are their own education authorities, is only 12 per cent. lower than that of the group of county boroughs, notwithstanding the fact that the average populations of the two groups is as 36,000 to 137,000, or as 1 to nearly 4. The total revenue also of the former group bears a similar relation to that of the latter.

In the case of several services, such for instance as salaries and superannuation, street maintenance, public lighting and sewerage, there appears to be little or no direct relation between *per capita* cost and population. Indeed, as regards the three last, the uniformity

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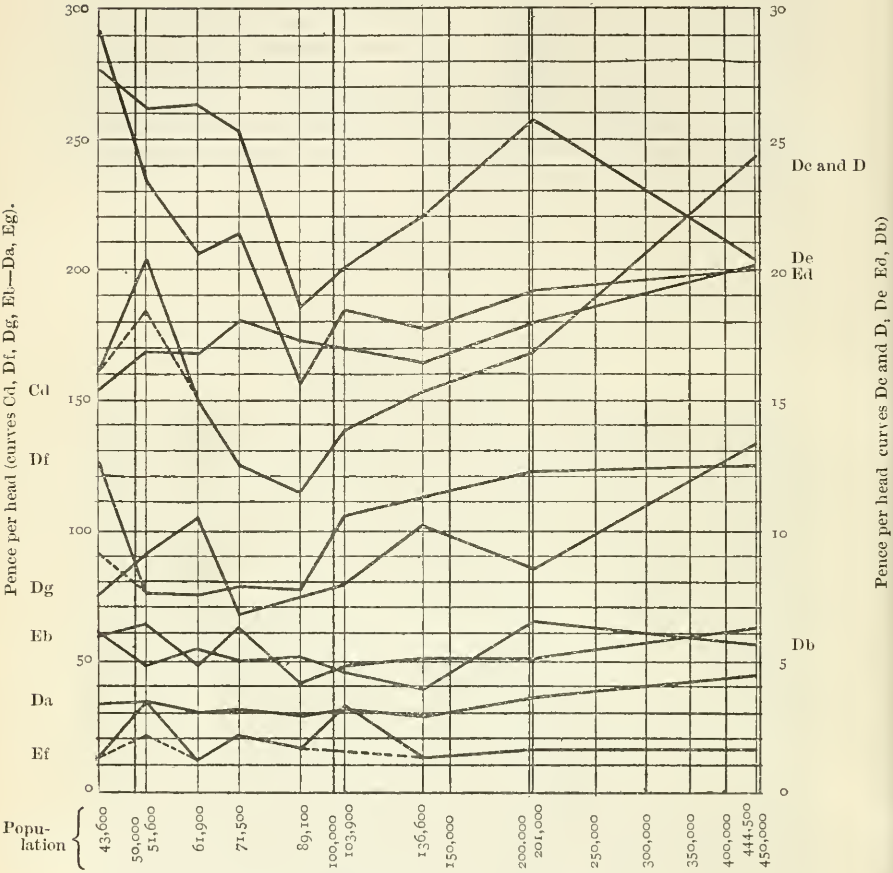
[1] *Rates, being the revenue and expenditure of boroughs and urban district councils of* 10,000 *or more inhabitants* (*England and Wales*). Analysed and compared by C. Ashmore Baker. London: P. S. King and Son.

FIG. 1.—*Diagram connecting population and expenditure for county boroughs.*

(From *Rates*, 1910.)



Explanation.—The curves represent expenditures in pence per head of population as follows:—

Cd	Education.
Da	Police.
Db	Justice.
Dc + d	Hospitals, libraries and museums.
De	Salaries and superannuation allowances.
Df	Sundry loan charges (mostly non-reproductive).
Dg	Other miscellaneous expenditure.
Eb	Maintenance of roads and streets.
Ed	Public lighting.
Ef	Sewerage.

The curves lettered on the left refer to the left-hand vertical scale of pence; those lettered on the right to the right-hand scale.

In certain cases wide departures from the normal are due to one of the towns in the group of eight to which this point on the curve relates, having an abnormal expenditure under the heading in question (*e.g.*, Ef and Df). In such cases the mean of the remaining seven towns is indicated by a dotted line.

N.B.—The abscissae are in all cases divided logarithmically.

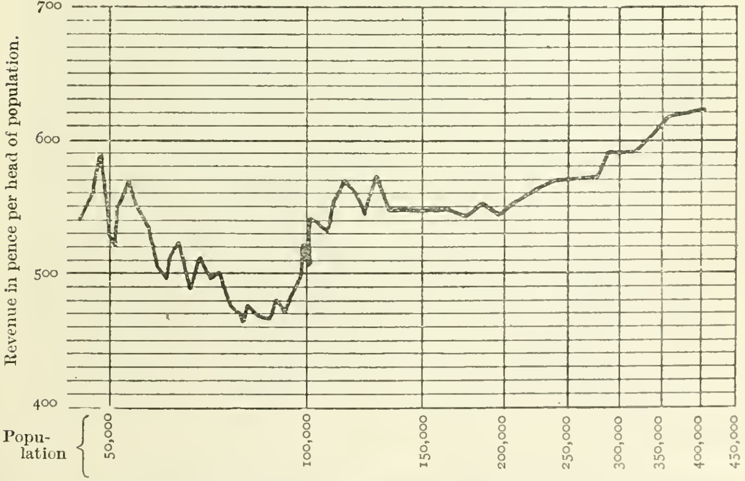
between the average figures for the four groups of towns is a particularly striking fact. Thus:—

Numbers.	Group.	Average population.	Per capita costs for		
			Roads.	Lighting.	Sewerage.
			d.	*d.*	*d.*
72	County boroughs	137,500	55·0	19·7	16·2
54	Large urban districts	36,250	55·5	19·5	17·8
245	Non-county boroughs	16,900	57·4	21·1	15·9
756	Small urban districts	6,400	59·6	16·4	15·3

In order to ascertain the probable influence of population while eliminating to some extent such influence as might be exerted by differences in statutory powers, the writer has analysed the figures given in the tables for the important group of county boroughs, seventy-two in number, and varying in population from some 25,000 souls to nearly three-quarters of a million. These seventy-two towns having been arranged in order of population were divided into nine groups of eight towns each. The "unweighted" average cost per head for various services was then ascertained from the tables for each group of towns, and from the figures thus obtained the appended curves were prepared. (Fig. 1.)

On this diagram, the feature which immediately "jumps to the eye" is the tendency of nearly all the lines to reach a *minimum* in the neighbourhood of the 90,000 population mark. While this tendency is too regular throughout the whole set of curves to be fortuitous, it is not easy at once to point to an explanation.

FIG. 2.—*Municipal revenue and population.*



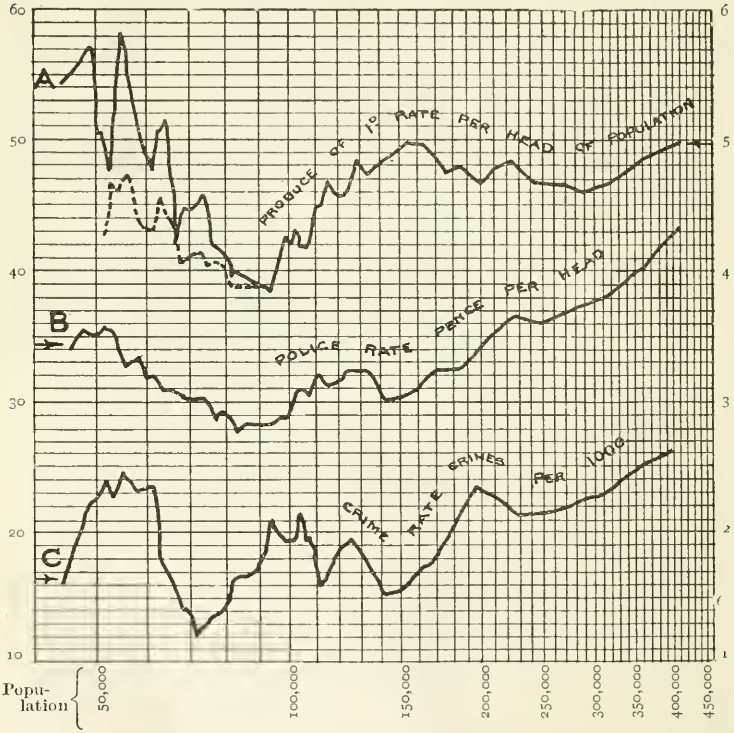
The above is a "smoothed" curve representing the variations of the total net revenue of the county boroughs with population. (From *Rates*, 1910.)

In this and the succeeding figures, the curve is "smoothed" by co-ordinating the average figures for every ten consecutive towns as described in the text.

It might well have been supposed that, as in ordinary business concerns, standing charges would cause expenditure under most heads to be higher for small than for large towns. A glance at the smoothed curve connecting population and total revenue (Fig. 2) will, however, show even more clearly that the average revenue per head to be raised by the small towns is less than that for the towns having the largest population figures, and that such relation as may exist is not as simple as might have been expected. This curve was prepared by plotting the average of every 10 consecutive towns in the list. Thus, the first point in the curve represents the average for towns 1 to 10 inclusive, the second point represents the average for towns 2 to 11 inclusive, and so on. This curve, as will be seen, reflects the general tendency of its component curves as indicated in Fig. 1.

An inspection of the tables themselves indicates wide variations in the cost of a given service as between town and town. Thus,

FIG. 3.—*Produce of 1d. rate, police rate, and crime (smoothed curves).*



A. The dotted branch is obtained by eliminating watering places and residential towns from "business" towns. (From *Rates*, 1910.)

B. Includes payments to pension funds. (From *Rates*, 1910.)

C. (From *Criminal Statistics*, Part I, 1906.)

under the head of public lighting per head, we have such divergent figures as 55*d.* in the case of Blackpool, and 5·8*d.* in that of Oldham, while sewerage varies from 1·3*d.* at St. Helens to 145*d.* at Burnley, and even such items as police and salaries and superannuation show ratios of three or four to one as between *maximum* and *minimum.* Notwithstanding such divergences as these, however, the curves, as I have said, do indicate a general interdependence between the two factors of cost and population which is too recurrent to be without significance.

The upper curves shown in Fig. 3 were therefore prepared, and it is at once apparent that the governing factor, at least for municipal expenditure, is rateable value, which is also, of course, a measure of rent. The dotted bifurcation of the top curve represents the figures relating to "business" towns only, the figures for residential towns and watering places having been deducted.

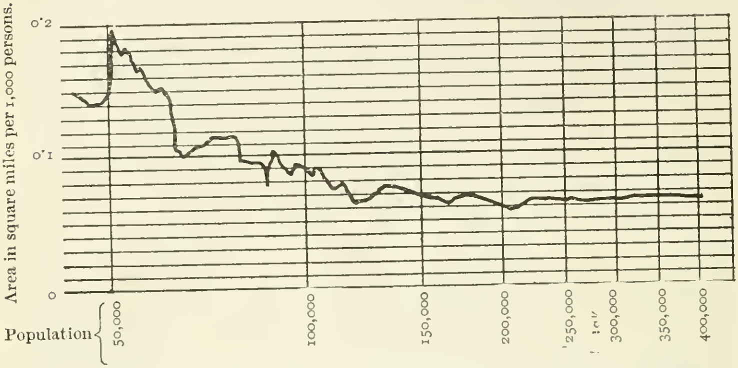
With a view to ascertaining if this influence of rent could be discovered in other directions, other curves were constructed in a similar manner, and it will be seen that in every case there is a distinct dip between the 70,000 and 90,000 population marks, at least indicated, and generally strongly marked. Fig. 4 represents the relation between population and area in square miles per thousand persons, and it is interesting to compare this with the top curve in Fig. 3. From such a comparison it may be seen that while up to a point in the neighbourhood of 90,000 both rent and area per head decrease together, beyond this point while area per head still falls and tends ultimately to become constant (*i.e.*, when the land is packed as full as it will hold) the rateable value (*i.e.*, rent) per head rises.

The meaning of this is probably as follows. In the smaller towns the "site value" per acre remains approximately constant, and the rent is spread over a greater number of persons as this population increases. At the point, however, at which the centre parts of the town become loaded to their *maximum* capacity, probably the point at which transit facilities become a necessity rather than a convenience, the site value commences to increase rapidly, giving rise to a corresponding increase in rateable value and rent, which would appear to be reflected in the cost of all activities wherein these two factors are involved.

It is interesting to observe the general resemblance between the crime rate curve and that representing expenditure on police (Fig. 3), the former being an accentuation of the latter. Whether police expenditure is dependent on the crime rate or whether the crime rate is a function of the percentage of policemen to population, I prefer to leave to observers more expert than myself to determine. At all events, it would not appear from the curves that police expenditure acts as a deterrent to crime, though both these figures have a distinct relation to rent.

Curves showing the cost of gas and electricity have been added (Figs. 5 and 6), and these are of some interest as, in contrast with the preceding figures, they do show on the whole a well-marked tendency for the cost to decrease as the population of the administrative area increases. The close general correspondence between these two curves is perhaps not so remarkable as might at first appear, the prevailing factors being the same in both cases, viz., price of coal and density of population (*cf.* Fig. 4).

FIG. 4.—*Population and population-density* (*smoothed curve*).



The hump commencing at the 50,000 population mark is chiefly due to the high ratio of area to population in the case of Barrow-in-Furness. (From *Rates*, 1910.)

FIG. 5.—*Cost of gas* (*per cent. of average*).

(From *Returns of Gas Undertakings for* 1907.)

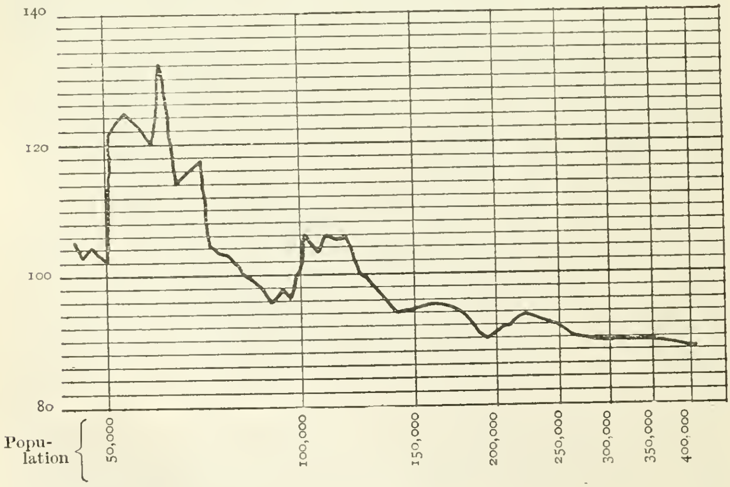
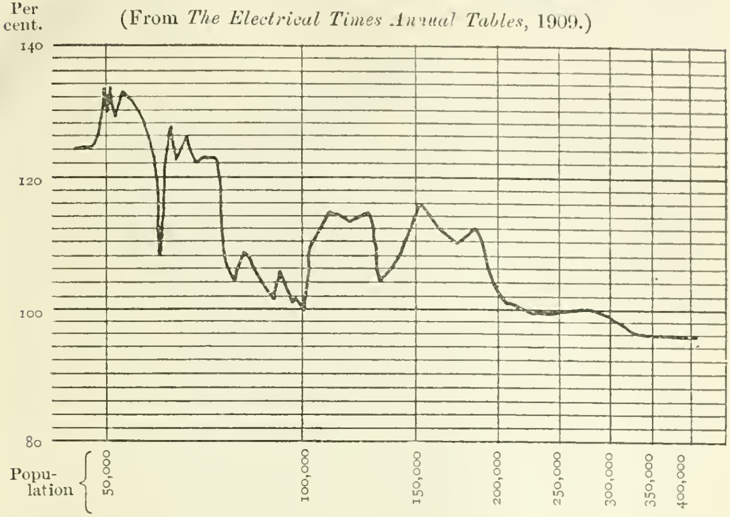


FIG. 6.—*Cost of electricity (per cent. of average).*

(From *The Electrical Times Annual Tables*, 1909.)



ERRATA.

Mr. Welton desires to call attention to the following errata in his paper published in the *Journal* for March, 1904, on the smaller urban districts of England and Wales :—

On page 31, " Falmouth, 16·9 per cent. of tailors," should be *sailors.*

In the small table on page 29, the ratio of "Indefinite workers (engine drivers, &c.) in Surrey" is printed "6·6," but should be 0·6 per cent.

On page 31, the ratio of "Carriage builders in Doncaster" is given as "7·1 per cent.," but should be 10.8 per cent.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Institut International d'Agriculture: statistique des superficies cultivées, de la production végétale et du bétail dans les pays adhérents.* 4to. Rome: Imprimerie de la chambre des députés, 1910.

Founded at Rome five years ago by a convention to which no less than 47 States have adhered, the International Agricultural Institute has, after somewhat protracted deliberations, settled down to its work, and has made a beginning in its task of diffusing periodic information to agriculturists by a series of bulletins. The new organisation has, however, done well, from a statistical point of view, in also giving publicity to a more permanent work of reference embodying much statistical detail in the form of a bulky Green Book bearing the above title. This formal "inventory," as it is officially described, serves a double part. It supplies a means of making known the basis whereon it is proposed to rest future comparative statements of the cropped area of the world, of the relative dimensions of the yearly harvests, and of the aggregate live stock of the States associated in the somewhat ambitious aims of the new Institute. At the same time, these tables illustrate the relative degree of progress of the civilised nations of the globe in effecting statistical records of their agricultural position and capacity, thus revealing the wide gaps and grave deficiencies which still exist in many quarters. In this respect it emphasises the appeal, not now for the first time made, to statisticians everywhere to amplify and complete the data which are so primarily essential to a knowledge of the well-being alike of producing and consuming populations.

That the inventory could not be complete is obvious. Even the formidable list of well-nigh half-a-hundred States, ranging in area from the wide areas of the Russian Empire to the microscopic units of Luxembourg and of San Marino, does not exhaust the nominal roll of the world's peoples. Among the adhering countries, moreover, some are not yet awake to the need of recording facts at all, and the efforts of others are still too fragmentary to be effectively ranged alongside of their more active neighbours. Thus, China, with a quarter of the globe's population, can tell the Institute nothing; and for vast areas of central or western Asia, for much of Africa, of Central America, and of the inter-tropical regions of South America the information wanted is still lacking.

Out of the 47 adhering States, 11 contribute nothing, 36 supply figures as to their live stock, and 29 of these go farther and are stated to possess a statistical service furnishing statements of agricultural areas and produce. The black list of defaulters includes 4 European countries—Turkey, Greece, Montenegro, and San Marino. Two Asian States likewise—China and Persia—while adhering, to the convention of Rome, supply no figures; while it is no matter of surprise to find Ethiopia, Brazil, Ecuador, Peru, and Salvador in like statistical abstention.

We may have to wait some time before the regions named can furnish information; but the reforming zeal now credited to China and to the New Turkish Government may, before many years have gone, allow these empires to be shepherded into the statistical fold. It is, at all events, satisfactory to see that only 2¼ per cent. of the European population, with 2½ per cent. of the European total area, fail to-day to make some response to the demand for figures. This was not always the case, as those who in the debates of the International Statistical Institute and in the fairly extensive tables of our own Board of Agriculture have long ago complained. Some further explanation is wanted, however, for the omission of important British Colonies in South Africa which are duly accounted for in our own official statistics; and their absence is not balanced by the newer data from Cuba, or Costa Rica, or Nicaragua.

The present tables aim at presenting information respecting (1) the surface area of each country and its distribution in great categories of cultivation, (2) the absolute area and yield of individual crops, (3) the relative areas and estimated production of the several reporting States grouped geographically for each of the following leading products:—wheat, rye, barley, oats, maize, rice, and cotton. The fourth and fifth sections of the tables supply statistics of the number of live stock, with relative as well as absolute statements showing the proportion borne by the animals to superficies and to population in each country, and a comparison, not attempted for the crops, is offered here to indicate the changes effected over a period of twenty-five years in the head of stock maintained.

Any summation of general results and exposition of the numerous qualifications of the statements offered, consequent on the varying systems of record and the more or less defective data, would carry the reviewer beyond the sphere of a note simply designed to draw the attention of investigators to the new sources of information forthcoming, and to the useful details respecting the methods of presentation and the equivalents employed for the reduction of the original data into a uniform series of tables in *hectares* and *quintals*, respectively.

Taking the tables of wheat areas alone as a sample of the matter respecting vegetable produce, we do not find for the latest year reviewed, 1909, more than 21 units furnishing data, and, among those for earlier years, we miss the certainly existing figures for Algeria, for Bulgaria, and for Tunis which our own Board of Agriculture can supply. There seems no explanation of the absence of the first-named important dependency of France, for which annual official data have for years appeared elsewhere. The omission of any Bulgarian returns, except for two years, 1904-05, is another gap, which should be rectified in the Roman office, for the later figures have been used in the Institute's own Bulletins both for this country and for Tunis.

For 1908, a more complete year than 1909, there are 27 States brought into line, with an aggregate area of over 90,000,000 hectares, roughly 225,000,000 acres of wheat land. But it is a little difficult to trace the movement upwards of this total in the comparative table which gives each year from 1899 onwards, since the totals are affected by the States inserted and omitted in certain years. For other cereals a like criticism may apply, while the narrow limits within which rice and cotton are grown among the adhering States cannot fail to arrest attention.

The condensed tabular contrast of relative crop yields over a series of years is a feature to be commended in this volume, and will save some enquirers a good deal of labour by the juxtaposition in which the figures are grouped.

In the more ambitious effort made in the live stock tables, details for recent years are supplemented by an attempted survey and comparison of the latest data with those of a quarter of a century before, both absolutely and in the ratio the figures bear to the superficial area and population of the States contrasted. The confusing variety of dates and differing intervals on which live stock returns are attempted, of course, prevents an exact period of twenty-five years being dealt with. Remembering the recent valuable paper by Mr. Hooker which the Royal Statistical Society had before it, on the bearing upon the meat supply of the changes in stock, one may hope that the calculations here offered, as to the relative density, the growth or diminution of the cattle and sheep of the States here named, will be found to offer an opportunity for a further study of this interesting branch of statistics.

If it were not ungracious to close this notice with two words of criticism, a reviewer might naturally ask if a further column, easily calculated from the data given, might not have been usefully printed, giving the density of the inhabitants per 1,000 hectares, as well as that of the live stock. This would serve to emphasise the essentially different categories to which the contrasted States belong. Surely, however, there is an error of some magnitude in the total of the table giving the aggregate area of the countries for which the live stock changes are shown (Table IV, p. 154). As it stands the total population of the 38 units accounted for there is given as 898,000,000 persons, which appears correct, while the area is set down as 4,295,000,000 hectares in place of 6,295,000,000. As the much smaller and erroneous total seems to have been used without correction for all the calculations of the average densities in the last line of the table, a consequent serious exaggeration occurs in the aggregate averages of each kind of stock on so much of the world's surface as is here represented. P.G.C.

2.—*Age incidence, sex, and comparative frequency in disease.* By J. Grant Andrew, M.B., M.Ch., F.R.C.P. and S. (Glas.), Surg. Victoria Infirmary, Glasgow, 1909. 8vo. London: Baillière, Tindall, and Cox. Price 10s. 6*d.* net.

In this work is given an analysis of 42,603 cases selected from the total admissions to the Glasgow Infirmary during a period of ten years, the cases tabulated being those in which a definite diagnosis was recorded.

The arrangement of the diseases is alphabetical throughout and not, as might have been expected, based on a pathological basis, with, where required, an anatomical subdivision. It is, however, so difficult to decide what form of tabulation will be most generally useful, that we are not prepared to find fault with the system adopted, the more so as we have examined the book from a statistical rather than a medical point of view. From that point of view, however, there are two serious blemishes in the book, to which attention must be directed.

In the first place, the age-grouping adopted is that of 0—10 years, 10—20, &c. The tendency to state ages in round numbers is well recognised, and the errors arising therefrom are so misleading that such age-grouping has been almost universally abandoned. With the grouping adopted it is impossible to use the data furnished by the book for comparison with the official records of sickness and death. Further, the author has introduced a grave doubt as to the age-limits of the groups he has chosen. He says, in alluding to them, "the decade terminates at the end of the ninth, nineteenth, twenty-ninth year, &c." Now the *ninth* year ends when the person completes the ninth year of existence, that is celebrates his ninth birthday. If then the group 0—10 years ends with the end of the ninth year, what becomes of the year between the ninth and tenth birthdays?

In the second place, the value attaching to statistics based on a total of over 40,000 cases, is much impaired by the minuteness of subdivision. As an example, the following may be quoted:—

ACTINOMYCOSIS.—Total number of cases 2.

Age arranged in decades.	Males.	Females,	Total.	Percentage in 2 cases.
Between 20 and 30	1	0	1	50
,, 40 ,, 50	1	0	1	50

Most common in adult life.
Sex.—Both cases were males. More frequent in males.
Frequency.—Of the 42,603 cases, 2 were actinomycosis, or 0·004 per cent.

It is superfluous to say anything about the value of percentages based on such a total as two cases, either in respect of ages or sex. Such numbers are equally useless for drawing conclusions, such as those given, and the author therefore based them on other sources. The fact that his figures were not relied upon when framing the conclusions given might have been conveniently indicated by a change of type. Unfortunately there are several examples of over-elaboration similar to that quoted above, and the author has apparently been lured into too much statistical detail.

It has long been a reproach that the valuable information which lies buried in hospital records has not been properly published in suitable statistical form, and is, therefore, wasted. What is required, however, is not a subdivision to the minuteness given in this work, but a grouping on broad lines, on a classification, or schedule, closely following that adopted by the Registrars-General, subdivided into sex and age-groups. In such a tabulation the whole of the information with reference to the "malignant neoplasmata," popularly designated "cancer," would be found in one section, not scattered under several independent headings, as has been done by the author. Further, any re-arrangement of the data according to site of the disease should be regional (anatomically) and not alphabetical.

To statisticians the book will be disappointing, unless they are prepared to undertake the task of re-arranging, after much searching out, the material which the book contains. Even then they will be faced with the difficulty that the age-grouping is unorthodox. These criticisms, however, have no relationship to the value or utility of the book to the medical profession. R.D.

3.—*Wholesale prices in Canada*, 1890-1909. Special report by R. H. Coats, B.A., Department of Labour. 509 pp., cr. 8vo. Ottawa, 1910.

In this report the results of a careful investigation into the fluctuations of prices in Canada during the past twenty years are set forth in detail, and illustrated by 113 charts showing the results for the several articles which contribute to the final aggregate. Prices of 230 commodities are recorded, and the price-movements of 18 sub-groups, as well as of the aggregate of all the commodities, are set out in the tables. Comparisons with the index number of the United States Department of Labour and with that of Mr. Sauerbeck show that the Canadian price-movement has been very similar to that of the United States, though apparently slightly less in range of fluctuation. The movement of the Canadian index number from 1890 to 1899 was almost identical with that of the Sauerbeck index, but the subsequent rise is more accentuated in the Canadian than in the British number. The figure for 1909 is about 32 per cent. above that of 1897, the lowest point of the period covered. The rise shown by the Sauerbeck index is about 20 per cent., that shown by the United States official compilation 40 per cent.

The method adopted is that of a simple arithmetic average, and the results of weighting the individual articles have also been calculated, and show a movement differing very little from that shown by the unweighted means, though the upward and downward movements are somewhat magnified in the weighted means.

The procedure adopted and the sources of the quotations are very carefully set forth in a fashion similar to that adopted in the annual reports of the Washington bureau. An appendix to the report proper contains a summary of information in regard to the principal index numbers compiled in other countries, and a discussion of the principles which should govern the compilation of such numbers. This memorandum is carefully written, and shows that the writer of the report has approached his task armed with the knowledge necessary for bringing it to a satisfactory issue. The brief discussion of causes and effects of price fluctuations is also marked by moderation and freedom from narrow prejudices; in fact, the work has quite clearly been carried out in a scientific spirit, and reflects much credit on the compiler of the report and on the Canadian Department of Labour.

A few tables comparing wages in 1899 and 1909 in certain occupations in Canada are, it would appear, an earnest of a more extensive study of wage movements to be made in due course.

A.W.F.

4.—*Small-pox and vaccination in British India.* By Major S. P. James, M.D., Statistical Officer to the Government of India in the Sanitary and Medical Departments. Sm. 4to. Calcutta: Thacker, Spink, and Co., 1909.

Few countries afford as good an opening as India for the study of widespread epidemic diseases and in none, probably, are remedial measures put to so severe a test. The author of this work has worthily followed in the footsteps of many of his predecessors in taking advantage of the record of wide and valuable experience of which he is in statistical charge, and the results of his investigation should command the attention and interest of a wider circle than that of exclusively professional students. The battle with small-pox in India is one of the hardest in which science has been engaged, and though it is not yet over, the ultimate success of the latter combatant seems to be foreshadowed by the facts which Major James has here expounded. That the malady has been widely prevalent in the country from time immemorial is proved by its being placed under the tutelage of a special goddess of pre-Aryan origin, for her shrine is never admitted within the village and her ministrants are invariably members of one of the helot or impure castes, which belong to races found on the soil when the settlers from the north-west entered the country. Such information as is available about the disease in earlier times shows that its ravages were most appalling. Those who know India even forty years ago will remember how high a proportion of the middle and lower classes bore traces of the disease either in pitted faces or in the loss of one or both eyes. It was about this time that death registration was put on a regular footing, and vaccination, which had been introduced sporadically and without method, except in a few Provinces, was placed under departmental experts. It is from this date, then, that our author, after a brief sketch of the history of preventive measures in India, starts his statistical review. This is of the simplest character, since, as he explains, the object he has in view does not require the more elaborate analysis which the material invites. The first step he takes is to set forth the annual deaths from small-pox per 1,000,000 of population in each Province between 1868 or thereabouts and 1907. This period is then divided as nearly as possible in the middle, and the ratio re-calculated for the two periods separately. Thus, from the first year to about 1887-88 may be termed the time of registrational and vaccinational "infancy," whilst the later vicennium is that of "adolescence." As there are marked differences between the Provinces both in the date at which operations were initiated and in the efficiency with which the local authorities are able to carry them out, the series falls into two groups, six Provinces standing out above the eastern tracts of Bengal, Assam, and Lower Burma, where the circumstances have been unfavourable to progress. The former group is entitled by the author "Well-vaccinated India," but the latter is relegated to the colourless insignificance of "British India as a whole." The explanation given by the author (p. 76) of the inclusion of a general table of this description, albeit accompanied by a full-blooded depreciation of its futility, is one which appeals, we hope, to the students of no statistics but those relating to vaccination. In other spheres of our pursuit the subdivision of returns into similar, and therefore comparable groups is not held to be "juggling with the figures." We may unabashedly quote, accordingly, Major James's calculation that, in "Well-vaccinated India," in a population of now over 137,000,000, the rate of small-pox deaths per 1,000,000 was 1,318 between 1868 and 1877, and 361 from 1898 to 1907. On the other hand, it is well-known that in India the estimate of population from year to year is even more fallible than in the West. To eliminate this cause of error, the ratio of small-pox deaths to deaths from all causes can be used. It then appears that the ratio in the aggregate of the six Provinces of the first group exceeded 5 per cent. on ten occasions in the twenty years ending with 1887, but between that year and 1907 this proportion was never once reached. On the other hand, in the inoculated or badly-vaccinated Bengal, Assam, and Burma, the proportion was exceeded in the earlier period from six to eight times, and from four to seven in the later. A remarkable decrease in the number of the blind is also cited by the author as evidence of the decline or mitigation of small-pox. It is true that in most parts of

India this disease was credited forty years ago with 80, or even 90, per cent. of the loss of the sight of one or both eyes, and the decrease is coincident with the decline in small-pox. At the same time, the connection of the returns of the two afflictions by correlation does not appear so close as to place the testimony on a par with that of the mortality rates. Moreover, the Census returns of blindness are not altogether trustworthy, and climatic conditions, too, influence the prevalence of this infirmity.

Sundry stock objections to the alleged efficacy of vaccination are dealt with in connection with the general conclusions stated by the author. He rules out of court, for instance, the suggestion that the decrease in small-pox is attributable to the abandonment of inoculation, by showing that the decline is most marked in those tracts in which inoculation has never been customary. Then, again, if there has been in modern times a "natural" or "cosmic" decline in the prevalence of the scourge, it is curious that it has been operative in those tracts only in which vaccination has been most general, and has passed over those in which the "superstitious rite" has been comparatively neglected. Sanitation, furthermore, cannot be credited with an improvement in regard to small-pox whilst it has left cholera to rage in all its pristine vigour. It is doubtful, indeed, if, in spite of the better scavenging and water supply in towns, the sanitary atmosphere of India is really much better than it used to be—relatively, that is, to the abatement of the two diseases mentioned just now. The new markets for employment which have been opened in the cities, the extension of railways between all the chief centres of pilgrimage, and the consideration that the enclosed or walled village is as densely peopled as a town, are all factors which facilitate the spread of an epidemic, whilst the increased accuracy in the general registration of deaths makes the decreased number attributed to so easily distinguishable a cause as small-pox the more remarkable.

There are some figures in the later portion of the book referring to the British and native army which are well worth the consideration of people in a country where vaccination is being allowed to fall off. The number of the unvaccinated amongst the British soldiers, which was only 2,400 in 1902, was 20,600 four years later, and the proportion of attacks of small-pox, which had formerly been far below that in the native army, rose in the above period far above it; the mortality also was higher. The experience amongst the wives of the British troops, too, is very remarkable. In spite of their less exposure to risk, and the fact that their liability to cholera and enteric fever is greatly below that of the men, the admissions amongst them on account of small-pox are seldom less than treble those of the other sex; and it is found that only a very small minority of this class has been successfully re-vaccinated. Figures such as those put forward in this volume are not to be set aside without careful examination. It is admitted by the author that a good deal of ground has, for the reasons he gives, been left untouched by statistical analysis, which, however, he does not think will affect the broad deductions he has here made. J.A.B.

5.—*Les naissances en France. Sa situation. Ses conséquences. Ses causes. Existe-t-il des remèdes?* Par Raoul de Félice. 370 pp., 8vo. Paris: Hachette and Cie, 1910.

"The same old dish with a different sauce" will be the first impression given by the title of this work, and, with the recollection of the State Commission, and the numerous works already given to the world on this subject in its various phases by some of the best statisticians and economists of France, the anticipation is justifiable. The first portion of the book follows, indeed, the well-beaten track of the declining birth-rate and the disadvantage at which France is placed by its stationary population in regard to its military and economic position in the world. When, however, Professor de Félice comes to deal with the causes of the decline, he takes a more independent line, and places on the dissecting table the laws of population from Malthus downwards, so far as they are illustrated by the conditions of the community with which he is concerned. In treating of the numerous factors which appear to him or others to have brought about, or to be confirming, the present tendencies, he makes considerable use of statistical evidence, which he sets forth in a telling form, especially when showing the nature and extent of variations geographically, or by departments. It is to be noted, however, that in connection with the decreasing or stationary population, he does not enter into the comparatively small decline in France of the death-rate as an inadequate counterpoise to a declining natality. In the main, he relies less upon statistical proof than upon that of physiology and medicine, together with the recognised general facts of social life in the present day. Some of the causes of sterility he mentions are not, of course, confined to France, though he undoubtedly sets the latter in a very bad light in respect of certain usages which public opinion elsewhere has more effectively condemned. The more interesting portion of his work, however, is that in which he examines such influences as those which tend to the abstention from, or postponement of, marriage, and to the restriction of the number of children after it. The operation of these influences is peculiarly national, and the correlation of them with geographical variations yields some curious results. After a passing glance at immorality, which the author considers may be possibly no greater in his country than in another, though more blatant, he devotes some forty pages to "Neo-Malthusianism," in a lively criticism assailing the various Utopian schemes propounded by its disciples. But he reverts to his former pessimistic tone when he has to admit the wide-spread hold which the notions and practices called by the above misnomer have gained throughout France, and the extent to which the law winks at the public complicity of surgeons and midwives in preventive measures for which the Malthusian term "checks" is decidedly euphemistic. Here, however, he allows himself the cold comfort of a sigh over a similar state of things in cities of the sister Republic across the Atlantic.

The general conclusion at which the author arrives is that the French character has become weaker, and enterprise has succumbed to comfort. A large family is a responsibility which curtails the *vie facile* of the parents, and is likely to do the same for the offspring. Prudence, therefore, dictates restriction or abstinence. Our author would combat the neo-Malthusianism of the age by "measures" calculated to diminish the burden of children on their parents; or, in other words, to "give large families the compensation to which they have a right." The list of such measures of compensation is a long one, not quite equal, however, to the thirty-three methods of increasing the population mentioned by M. Bertillon. Professor de Félice would not impose penal taxation upon bachelors, but would rather relieve from taxation the father of a family—see our own latest income tax, only more so. He would allow substantial concessions in regard to military service, and would reserve certain State and Municipal appointments to Benedicts. The pensions of the aged should be graduated directly as the number of children given to the Fatherland, and on the same principle, the contributions towards insurance against accidents should be graduated inversely, since the Compensation Acts now make employers reluctant to engage fathers. The laws of inheritance, too, require modification, and octroi, excise, and customs duties on articles of prime necessity should be reduced or abolished. Whether such expedients, with the rest, would do all the author hopes may be doubtful, but he knows well the circumstances of his country, and much that he recommends may fairly claim our sympathy. His plan, however, of dealing with the *faiseuses d'anges*, through pregnant clients *dûment assermentées* to the police, leaves us cold. It savours overmuch of the methods of Noah Claypole and his Charlotte.

In recommending the work for recognition by the Academy, its sponsor, M. Joly, passed the criticism that it was overladen with quotations, but, considering the amount of literature in existence on the questions discussed, and the number of points in which the author found himself at variance with some of his forerunners, this seems a venial fault. A certain want of decision was also imputed to his general conclusions. Here, again, the complexity of the subject is such that caution is inevitable. As regards remedies, on the other hand, M. de Félice, as may be surmised from what has been said above, shows no vacillation.

J.A.B.

6.—*Wert und Preis unbebauter Liegenschaften in der modernen Grossstadt.* Von Dr. Heinrich Peter. 169 pp., 8vo. Karlsruhe i. B.: G. Braunsche. Price 5 marks.

The value of urban land is a subject of considerable current interest. Although, in the present work, answers are not forthcoming to the many complex questions arising in connection with site value, increment value, and other matters very much to the fore in this country at this time, the book will, nevertheless, be found suggestive to the general reader who desires a clear statement of some of the main conditions governing urban values. Dr. Peter's task was undertaken for administrative purposes, and the statistics with which he exemplifies and tests his conclusions are drawn from the records of sales of unbuilt-on properties in Mannheim during the period 1895-1906.

Urban land has value, of course, for building purposes, and Dr. Peter discusses the causes of variations in building activity. While this activity is mainly dependent on the size and movements of the population, the output of new houses in any year appearing to be correlated with the migrations of the population in the preceding year, it varies in degree in different localities in the same town. For example, working class quarters suffer most in times of depression, since their inhabitants migrate fairly readily to regions of less depression; business districts, however, experience least variation between good and bad times, since the capital sunk in those districts imparts a "steadiness to building development." The migratory habits of the working classes are a direct result of modern industrial conditions, and it is to this cause that Dr. Peter ascribes the fact that people for the most part rent their houses and do not own them. In this respect he dissents from the view of those persons who attribute this phenomenon to the influence of speculation in forcing up the price of land, and therefore of houses. The causes of the rise and fall of rent in different parts of the town are discussed, with a tendency, we think, unduly to minimise the supply side of the question.

Dr. Peter then deals with land value and price, ground rent, and land speculation, and in doing so lays down the proposition that the value of urban land is determined by the rent or revenue obtainable from it when put to its greatest use. Thus land on the borders of a town is valued as building land and not as agricultural or market garden land; a piece of land in the centre of the town has its value determined by its yield as the site of business premises and not of dwelling-houses. Supply and demand are considered to have a relatively small influence in settling the value. The influence of speculators is also regarded as very limited. The policy of "holding-up" the land is in fact thought by the author in most cases to end unfavourably to the operator.

As already stated, many questions connected with urban land value are not touched upon at all, but as a discussion of broad conditions and principles the book is certainly interesting and useful. A.D.W.

7.—*The cotton industry in Switzerland, Vorarlberg, and Italy.* By S. L. Besso, LL.B. xv + 229 pp., 8vo. Manchester University Press, 1910. Price 3*s.* 6*d.* net.

This volume forms the ninth of the series of Gartside reports on industry and commerce, and, like most of its predecessors in the series, is the report of the holder of one of the Gartside scholarships. For each of the countries to which it refers it contains a statement of the present position of the cotton industry, some reference to its past development, and comparisons with certain features of the situation in Lancashire. The spinning and weaving branches are considered separately in each case, and bleaching, dyeing and other branches of the handling of the cloth produced are treated in turn. The commercial organisation is sketched, and the leading markets served are mentioned; the sources from which the labour supply is drawn, and its organisation, are described; the conditions of life of the operatives, their wages and the relation of wages to cost of living, are discussed; the legislation dealing with the protection of labour is summarised; and the associations both of workpeople and of employers are passed under review.

It will be seen that the plan of the report is an excellent one, and it may be said that the plan is admirably carried out by the investigator, who has thus rendered an account of his work while holding his scholarship. The book is clearly written and contains a large amount of information, set forth with an apparent freedom from desire to turn the results into an argument related to current controversial matters. Features in which the local industry in the several countries possesses advantages over the Lancashire industry are stated, and other points in which these relations are inverted are not omitted. Comparisons of the numbers of workpeople engaged in relation to the amount of machinery employed are an instructive element in the exposition of the situation. Statements as to the relative merits of different kinds of machinery or of different processes appear to be a little dogmatic, but the plan of the report would hardly permit of the technical discussion at length of the points on which the judgment expressed rests.

Some of the statistics used to show the position in Switzerland are, unfortunately, those of five or even ten years ago, and the bald assertion that little change has since occurred, or a similar phrase, is not entirely satisfactory, especially when such a statement serves to justify the rejection of figures of some authority in favour of others gathered from different sources. The arrangement of the statistics of imports and exports adopted is also somewhat lacking in apparent justification, groupings of years for comparison being, so far as any explanation shows, rather haphazard. A resulting elliptic piece of argument, which occurs on page 9, may be mentioned, the imports of raw cotton and cotton waste being there shown both for the period 1897-1906 and for 1902-07. For the former period the exports are mentioned, for the latter they are stated to be small. As a matter of fact, the exports of cotton waste exceeded the imports in the years 1902-7, for which the latter are separately stated by the author, and this, combined with the fact that the net import of cotton in 1907 was exceptionally large, deprives the attempted demonstration of an increased consumption, in the later years covered by the figures as compared with the earlier years, of its apparent force. On the following page, the figures of imports and exports of yarn appear to represent only three of thirteen tariff headings relating to cotton yarn, and though the conclusion drawn is not affected, the figures are very misleading as to the volume of the trade. Elsewhere the confusion here illustrated does not, so far as we have tested the figures, recur, though on p. 137, in dealing with imports of cotton into Italy, which are given for the periods 1885-7, 1888-93, 1894-1901, 1902-4, 1905-6, the last period but one should apparently be 1903-4, and the year 1902 appears to have been omitted from the record. In some places there seems to be evidence that the different sections of the report on each country were not written in the order in which they are placed in the volume, and explanations of certain points are consequently deferred where it has not been convenient to transfer them from the places originally assigned. In a few cases the help of references in footnotes to these later pages is lacking.

The points we have mentioned relate rather to the details of the presentation of the account of Mr. Besso's investigation than to that investigation itself. As already stated, the report is on the whole very well put together, and shows its author to be possessed of considerable power of observation, and of recording the results of such observation, and a mind of excellent balance, the manner in which topics inviting to partisans are handled inclining the reader to accept readily the judgments of the author on matters where evidence cannot be presented conveniently. A.W.F.

8.—*Die eheliche und uneheliche Fruchtbarkeit mit besonderer Berücksichtigung Bayerns.* 154 pp., crown 8vo. München, 1909.

This study of human fertility in the principal countries of the world, and in Bavaria in particular, is issued in the series of statistical publications of the Statistisches Landesamt of Bavaria. The first part of the volume is devoted to a discussion of the proper measure of fertility, legitimate and illegitimate, and a survey of various methods proposed by different writers. The system advocated in their papers read before the Royal Statistical Society in 1906 by Drs. Newsholme and Stevenson is that which is selected as the best, though a modification of the process of computation is suggested. A curious arithmetical slip on p. 17 suffices to conceal the fact that the modification is only in appearance, not a reality. The second part of the volume is devoted to an examination of the changes which have occurred in the absolute and relative fertilities during the forty years ending 1905 in the countries for which the necessary information is available, and the statistics for the different geographical subdivisions of Bavaria are similarly compared. In the third part of the volume a special examination of the Bavarian statistics is made with the purpose of determining how far the causes of the reduction which has occurred in the figures measuring fertility are capable of elucidation. As regards some of the important influences the conclusions reached are not very positive, as for example in regard to the relation of thrift, or of the concentration of population in towns, to fertility. In regard to others, such as occupation, whether agricultural or industrial, the conclusion suggested is more definite. The evidence is presented in lengthy tables with numerous columns, and the student might wish that the device of the calculation of correlation coefficients were adopted to reduce the somewhat unwieldy mass of figures to a more readily intelligible expression. The material presented may afford an opportunity to students capable of operating upon it with the statistical machinery now becoming familiar. Two cartograms and a number of diagrams afford pictorial expression to some of the principal groups of figures resulting from the calculations of the compilers of the volume. In the latter the course of the fertility index for urban and extra-urban populations in each of the provinces of Bavaria is traced for nearly forty years, and the contrasts between the ebb and flow manifested by these pairs of lines, and the comparison between the lines for legitimate and those for illegitimate fertility, are of considerable interest. How far these contrasts may be related to the occurrence of births in other localities than those where one or both parents ordinarily reside is a question which occurs to the reader, but which we have no space to discuss here. A.W.F.

9.—*National and local finance: a review of the relations between the central and local authorities in England, France, Belgium, and Prussia during the nineteenth century.* By J. Watson Grice, B.Sc. (Econ.). With a Preface by Sidney Webb, LL.B. xxiv + 404 pp., 8vo. London: P. S. King and Son, 1910. Price 10*s.* 6*d.* net.

The literature in English upon foreign systems of local taxation and finance is decidedly scanty in quantity and unsatisfactory in quality, and this volume in the series of studies published in connection with the London School of Economics and Political Science is a welcome and useful addition to its ranks. The first part of the book gives an interesting sketch of the history of the English grants-in-aid system, together with some sound criticism of its present workings; and Mr. Sidney Webb, in the preface which he has contributed to Mr. Grice's study, deduces from the history the conclusion that we have stumbled quite accidentally, but with our wonted good fortune, upon a plan which can be made infinitely more effective for securing general administrative efficiency than anything yet devised by our continental neighbours, even when allowance is made for the difference in the principles underlying the respective systems of local government. But this matter is more or less familiar to English students of political science; the remainder of Mr. Grice's book has much greater novelty. The author has brought together a large amount of information as to the systems of local taxation in the three foreign countries included in his survey, and he has given an instructive account of the relations which exist there between the local and central authorities, in respect both of the assistance given by the latter and of the control exercised over local expenditure and indebtedness. It is not possible in this place to enter upon any discussion of the numerous questions, political and economic, which are suggested by such an investigation; it must suffice to say that the study is of particular interest at the present time, when the swift increase of central expenditure, combined with the continued growth in local expenditure in response to the needs of a rising civilisation, is rapidly rendering absolutely necessary, alike in the United Kingdom, Germany, and France, a complete reconsideration of systems of central and local finance, and of their inter-relation. In Germany, it is clear that reform, to be effective, must embrace Imperial, State, and local taxation; in the United Kingdom and France, though the difficulty is not so great or pressing, a general readjustment is becoming more and more desirable.

One point which Mr. Grice brings out incidentally should be a cause of some satisfaction to British statisticians. The statistics relating to the financial operations of local authorities in the United Kingdom, whilst open to some criticism, are unquestionably, in respect of completeness, regularity, and practical utility, far superior to anything which has yet been produced elsewhere; and Mr. Grice's book, extensive as is the statistical material which has been brought together, is full of evidence of the difficulty which he has encountered in the attempt to secure really satisfactory data, especially to cover any considerable series of years. Students of foreign financial systems are familiar with this difficulty, which becomes particularly acute when the inquiry is extended to local finance.

Mr. Grice's book deserves study by all students of administrative science; it is instructive and suggestive, and the following criticisms of points of detail are offered in the hope that the author may have an early opportunity of preparing a second edition. Chapter XI (p. 157) is headed "Central Assistance to Local Bodies in France for Roads," but it also includes primary education, police (in France, with comparisons of Paris, Berlin and London) and public assistance. A printer's omission has deprived the first note on p. 244 of much of its point—in general Mr. Grice has not been well served in the revision of proofs. Some of the statistical tables appear to call for reconsideration: it is not clear in Table IX (p. 376) to what year the figure of 193·4 million francs refers; the third column in the table on p. 18 might have been filled in; the table at the foot of p. 377 is printed in a needlessly obscure form; no authority is indicated for the tables on pp. 388—390; and the table on p. 138 would be more useful if some indication were given of what are included under the eight classes into which each occupation group appears there to be divided for the purposes of trade licenses. The statement on p. 242 that "while in France in 1877 the ratio of additional centimes revenue to total income was $\frac{138}{550}$, and in Belgium, in 1880, $\frac{11}{92}$, in Prussia it was $\frac{71}{108}$ in towns and $\frac{48}{63}$ in country communes," might have been simplified with advantage to the reader. The statement on p. 125 that political resolutions by the councils-general are expressly forbidden, needs some qualification—whatever the case may be at the present time, resolutions of confidence in the ministry of the time were not unwelcome a few years ago. On p. 122 the present reviewer is quoted in a manner which, doubtless unintentionally, credits him with an opinion, as to the possible action of the Council of State, which is entirely opposed to that which he actually expressed. It is a little odd to find the Report of the Gainsborough Commission given as the source of a table illustrating the working of the German old-age and infirmity insurance system on pp. 392 and 393. Finally, there is no apparent reason for the failure to give the dates of publication of a number of works included in the bibliography, which needs some rearrangement, whilst the dates are given in other cases; and Mr. Grice might well have added to his list the memoranda issued by the Imperial German Government during the recent controversy as to the reorganisation of the Imperial finances, which are not only a mine of information as to the financial systems of Germany, but also contain instructive accounts of the central and local finances of a number of European countries, as well as Japan and the United States. P.A.

10.—*Wool growing and the tariff: a study in the economic history of the United States.* By Chester Whitney Wright, Ph.D. xiv + 362 pp., with charts. 8vo. Boston and New York: Houghton Mifflin and Co., 1910. Price $2 net.

Raw wool was admitted free into the United States up to 1816; from that year to the present time it has always been dutiable (with some occasional exceptions in respect of the cheapest kinds), save during the short period from August, 1894, to July, 1897, under the Wilson Tariff. Since the imposition of the first duty of 15 per cent. *ad valorem* in 1816 the rates of duty have been changed sixteen times; at every revision of the customs tariff the problem of the wool and woollens schedule has loomed large, and through all the changes in the economic conditions of the United States it has provided the one permanent cause of tariff controversy. Mr. Wright's monograph, which gained the David A. Wells prize for 1907-08, and is published in the series of Harvard Economic Studies, is an attempt to disentangle the various influences which have determined the course of the wool-growing industry in the United States, to measure their relative importance, and so to arrive at some estimate of the effect upon that particular industry of a tariff policy which, with the numerous changes in degree already mentioned, has prevailed throughout practically the whole period of its existence.

Such an enquiry is of great importance and greater difficulty, and Mr. Wright is to be congratulated on the success of his effort. He has furnished us with a valuable contribution to the economic history of the United States, and his book attains a wider interest by its demonstration, elaborated through a great mass of detail, that in this, as in other cases, "the tendency to overestimate the power of the tariff, either for good or evil, is almost universal." The claims of the wool-growers; the demands of the manufacturers of woollens; attempts to reconcile the interests of the two groups (notably by the system of "compensatory" duties); the protests of the producers—all these have kept the wool-growing industry constantly in the minds of American politicians; and all the while the course of the industry in the United States has been determined in the main by forces which legislative action could affect but little.

Mr. Wright very properly regards the period from 1860 to 1870 as an episode which has little or no relation to the general history; but the long chapter which he devotes to that decade deserves careful study as illustrating, first, "the economic disturbance that follows in the train of war," and secondly, "the evils which follow in the train of a depreciated monetary standard; the deceptive character of the price level, the misleading and unduly stimulating effect of rising prices, and the hardships which follow when they begin to fall." But even when this period is put aside, as altogether abnormal and possessing no particular relation to the earlier or later development of the industry, the history of wool-growing in the United States is very complex, and the final outcome is the resultant of a number of very diverse influences, which Mr. Wright has examined in detail. The ultimate facts are that the number of sheep in the United States reached its maximum as long ago as 1884; that the average annual number for the period 1881-87 was 47·4 millions, for 1891-97 41·5 millions, and for 1901-07 39·7 millions; that there is no apparent probability of any change in the direction of the movement; and, finally, that in all parts of the United States, even where sheep-rearing has shown marked progress in recent years, there is a pronounced tendency for the farmer to have regard to the production rather of mutton than of wool.

Whilst this result has been brought about by many causes—the increase of population, the greater relative profitableness of other branches of farming, the rapid and heavy fall of American wool-prices in the period 1891-97 (a period of not very rapid expansion of the world's output), and the growth in favour of cotton and other substitutes for wool—the dominant force has, in Mr. Wright's judgment, been the tendency which wool-growing as an independent commercial enterprise has always and everywhere shown to "gravitate towards the outposts of civilisation" and to be emphatically a "frontier industry." Thus the home of wool-growing in the United States has moved gradually away from the East until it is now making its final stand in the extreme west of the continent. The following table gives the number of sheep in each of the six groups of States since 1840:—

(Thousands.)

	1840.	1850.	1860.	1870.	1880.	1890.	1900.
New England States	3,820	2,258	1,780	1,450	1,326	937	563
Middle Atlantic States	7,404	5,642	4,559	4,249	3,802	3,341	2,043
Southern States	4,521	5,667	5,939	5,189	8,679	9,311	4,855
North Central States....	3,203	6,831	6,912	11,165	10,566	9,450	6,900
Central west	363	913	1,230	2,474	3,152	2,899	3,216
Far Western States	—	414	2,052	3,952	14,282	14,939	22,229

This table, based on the census returns, is open to some criticism, but there is no question as to the general accuracy of the impression which it conveys. The New England and Middle Atlantic States show a steady decline since 1840; the increase for the Southern States between 1870 and 1890 was solely due to a remarkable development in Texas, the other twelve States in the group never reaching again their level of 1850, whilst after 1890 there was a heavy drop in Texas, owing to the growth of settlement; the North Central group has declined swiftly since 1890; and the number of sheep in the Central West has shown no expansion since 1880.

The second great increase in the Far Western group (chiefly Wyoming, Montana, Idaho and New Mexico—California experienced a sharp set-back) between 1890 and 1900 did not avail to check for any length of time the decline of sheep-rearing in the United States as a whole; and Mr. Wright is not optimistic as to the future. He points out that, the industry having traversed the entire continent, the period when the wool-grower could turn to new and unoccupied lands has come to an end. The growth and advance of population, with the consequent closer settlement, has made other forms of farming more convenient and financially more attractive; *within* the frontier sheep-rearing has come to be only a part of general mixed farming. *On* the western frontier there still remains a vast amount of public land, estimated at over 300 million acres, which the Public Land Commission reported in 1905 to be "unsuitable for cultivation under the present known conditions of agriculture, and so located that they cannot be reclaimed by irrigation. They are, and always must be, of chief value for grazing." Here then sheep-raising has found a home from which it is not likely soon to be removed: but even here, in spite of the present level of wool prices (which seems likely to be maintained), the stationary character of the demand for wool (due in part to prices but more to the growth in favour of substitutes) and the increasing demand for mutton is causing the sheep-raiser "to give more of his attention to the meat-producing qualities of his flock and less to the fleece. In brief, wool-growing as the main object in sheep raising, having already disappeared from the East, seems destined to play a less and less important part in the West."

In the presence of such a movement the effect of tariff enactments has been relatively small. Mr. Wright, whose general views on tariff questions appear to have been influenced largely by Professor Taussig, is, however, inclined to believe that for the wool-growers of the extreme west the tariff may be of some practical importance in the future. Hitherto, in his opinion, the only serious competition to wool-growing has been that of other agricultural produce, and in support of this view emphasis is laid on the striking fact that though as a result of the drop in American wool prices between 1893 and 1897, which was caused largely by the removal of the duty in 1894, there was a great decline in sheep-rearing in the East and Middle West, yet after the high duties were restored in 1897 and prices rose sharply there was no recovery in the industry there. In the Far West, however, as already indicated, there is little likelihood of competition from relatively more advantageous forms of farming; the main competition will be from foreign wool, and under such conditions the tariff may play a considerable *rôle*.

It remains only to add that Mr. Wright's book contains a great mass of useful statistics (there is a slip in the table at the foot of p. 162, where "thousands" of pounds should be "millions") and a lengthy bibliography which, however, would be of more value if accompanied by notes indicating the nature and value of the various works catalogued.

P.A.

11.—*Social insurance: a program of social reform.* By Henry Rogers Seager. [American Social Progress Series: the Kennedy lectures for 1910, in the School of Philanthropy, conducted by the Charity Organisation Society of the City of New York.] 175 pp., sm. 8vo. New York: the Macmillan Company, 1910. Price 4*s.* 6*d.* net.

The author of this work is Professor of Political Economy in Columbia University. In it he considers the common welfare; industrial accidents, illness, and premature death, from the points of view of prevention and compensation; the causes of unemployment, and their remedies; provision for old age; and formulates what he considers should be the next steps in social advance.

Professor Seager thinks that changing industrial conditions are making saving more difficult; that industrial insurance is merely a provision of burial money; and that the wage-earners of America generally do not use the savings banks. He shows by statistics that the United States have a larger proportion of industrial accidents on their railroads and in their mines and factories than any other civilised country.

Investigations as to the proportion of accidents that is due to the industry have been inconclusive. In the State of Minnesota that proportion was recorded in one year as 54 per cent., and in the following year as 71 per cent. The same uncertainty applies to statistics of unemployment. Professor Seager thinks it is not too much to say that the present industrial organisation of the United States is wasteful, unintelligent, and even chaotic.

With regard to pauperism, on the other hand, statistics are favourable to the United States. In Massachusetts, the paupers in 1908 were 8·5 per 1,000 of the population, as compared with our 24·2 per 1,000, and those over 65 years of age 31·7 as against 173.

Discussing the German system of provision for old age, Professor Seager objects to it that (1) it imposes an onerous tax upon the employer; (2) the method of collection is cumbrous and costly; (3) it is questionable whether it tends to foster thrift. Our own old age pension system is commended by him, but its adoption by the United States is not advocated in the present state of public opinion. "Our experience with national military pensions has not predisposed us to favor national pensions of any description." He looks rather to an extension and improvement of the corporation pension systems that are already common in that country, and seem destined to become general. He would have them modified so as to promote, rather than retard, the mobility of labour, and in other respects to gain the approval of the wage earners.

In his summary of what he considers to be the most needed next steps in social advance, the author admits that he enters upon a controversial field. He calls for vigorous governmental action, for political reform, for industrial education, and for a deepening of the social consciousness. These are large demands upon a people possessing the instincts and the traditions of self-esteem and of individualism that are cherished in the United States. The work is instructive as a study of present conditions, and forcible as a plea for their amelioration. E.B.

12.—*Woman in industry, from seven points of view.* By G. M. Tuckwell, C. Smith, M. R. Macarthur, May Tennant, N. Adler, A. M. Anderson, and C. Black; with a Preface by D. J. Shackleton, M.P. 217 pp., sm. 8vo. London: Duckworth, 1910. Price 2*s*.

This is a re-issue of a volume of essays published two years ago. Each essay is on a subject relating to women's industries, and each is written by an expert on the subject under consideration. One or two of the papers have become somewhat out of date, mainly owing to the fact that the work carried on by the writers and others has achieved some measure of success, and the legislation advocated has actually become law in the intervening time. But all the papers contain much that is useful, informing, and interesting; they are clearly and easily written, and suitable to be put into the hands of those who have not time for long and difficult books. The reduction of price will doubtless be welcomed, and will make the book accessible to a larger public. B.L.H.

13.—*Women in industry.* By Edith Abbott, Ph.D., with an introductory note by Sophonisba P. Breckinridge, J.D., Ph.D. xxii + 409 pp., 8vo. New York and London: Appleton, 1910.

This book is more interesting historically than statistically, using the latter word in its narrower modern sense. The account given in chapters ii—iv of the change produced in the position of women through the introduction of machinery and the factory system is excellent, and shows careful research among such books and documents as throw any light upon the subject. As in England, spinning and weaving in the seventeenth century absorbed a great deal of the time of the women and girls of the period, and were still household industries carried on by members of families working together, with the assistance of domestic servants, if any. The work was done partly for domestic consumption, partly for sale; some of the finished product might be marketed or exchanged at the village store. With the expansion of industry which characterised the eighteenth century, it came about that, yarn being in great demand, many women were regularly employed spinning at home for purchasers who were commission merchants, and who either sold the yarn, or put it out again to be woven, and then sold the cloth. Schools were founded to train women and children in the practice of these industries, which were regarded as being meritorious as well as profitable. As the factory system gradually came to take the place of home industry, women were from the first employed in the spinning mills. "They had taken over no new employment, but the manner of carrying on the old had been changed." In the early part of the last century a new factory was called a "blessing to the community" (p. 50), among other reasons, because it would furnish employment for the women of the neighbourhood. Miss Abbott gives numerous quotations, showing the curiously exaggerated approval with which in early days factory work for women was viewed. Part of this enthusiasm was no doubt due to the plain economic reason that in a new country, where male labour was scarce and greatly needed for agriculture, manufacturing industry could hardly have been carried on at all without the aid of women and children. There was also at this time no social prejudice against the factory, and the Lowell mills in particular, as is well known, were resorted to by young women of good character and education. Miss Abbott lays much stress on this condition of public opinion in the late eighteenth and early nineteenth centuries, in order to emphasise the fact that the modern woman worker is not, as is often assumed, "an invader threatening to take over work which belongs to men by custom and prior right of occupation." She also gives statistics in Appendix B (p. 352) showing that the proportion of women in the total of persons employed is tending, and has for a considerable period tended, to fall rather than to rise. The book will be of great interest to all who are concerned with the problems of women's life and work. B.L.H.

14.—*Women and the trades*, Pittsburgh, 1907-08. By Eliz. B. Butler. The Pittsburgh Survey, Findings in 6 volumes. Edited by P. U. Kellogg. 8vo. New York: Charities Publication Committee, 1909.

In England, several works of this description have appeared in the last few years, in response to the growing sense of the communal importance of conditions of life and work, but none, perhaps, has been carried out with quite such masterly thoroughness as the present work. The plan of the Pittsburgh Survey is to complete in six volumes "a careful and fairly comprehensive study of the conditions under which working people live and labour in a great industrial city, and a fair public statement of facts discovered." The present, which appears to be the first volume of the series, is concerned with the circumstances of women's employment. Pittsburgh is not primarily a city of women's trades, such as a Lancashire textile town. It is as if we were to ask for a study of women's employment in Wolverhampton or Barrow-in-Furness. The inquiry reveals that in a city whose prosperity is founded on steel, iron, and coal, and whose characteristic occupations could not possibly be exercised by women—women stand beside the men in many workshops; and this, not only in the garment factories, confectionery factories, and canneries, where women are only carrying on their traditional occupations under changed conditions, but in the metal trades themselves. Thus, in the foundries, women are employed in the manufacture of cores. "They are employed irrespective of the kind of foundry, so long as the work is not too heavy or too intricate for them to handle." A line of cleavage separates the work of men from that of women. The heavy work, the cores of intricate design that require long training and craftsman's skill, are made by men. Women are used for the simpler, more obvious things—for the stock shapes of cores, which can be learned in a few weeks. In the more difficult branches there is no active competition between men and women, but there is "potentially," Miss Butler tells us, some competition, in so far as the small work, now given over to women, was once men's work. The women are doing the work at half the price of unorganised, and at a third the price of organised men. These observations are probably typical of a great deal of metal work done by women, not only in America, but in England.

A great deal of information is given as to wages, and a summary on p. 338 shows the percentage of women earning, in wage groups (p. 338):—

Unpaid apprentices.	$3 to $6.99.	$7 to $7.99.	$8 or over.	Total.
0·97	60·83	20·85	17·35	100

The scale must not be judged by English standards, for not only is living more costly, but apparently the standard of living is higher than in England. It is stated, as the result of comparing various estimates (p. 346), that the *minimum* below which a working girl cannot work and support herself decently in Pittsburgh, is $7 a week. Even if a girl shares a room with a friend, board and lodging costs from $4.50 to $5 a week; clothing about $2; which at best leaves only 50 cents for washing, recreation, medical care, and sundries. It is obvious that if these estimates be taken as correct, the majority of the girls working are not earning a living wage. The estimate for clothes may appear high, but we are told that "in every position, the clothing of the applicant is of increasing importance," and a poorly dressed girl may be refused a place even in a mill, where the nature of the work does not seem to demand, or even admit of, a high standard of refinement. But neatness, cleanliness, and, within limits, good clothes, are an indication of self-control and self-respect, and as such are perhaps more closely connected with industrial efficiency than might at first appear.

In regard to conditions as to health, Miss Butler has much that is weighty and thoughtful to say. The health of the worker is now recognised to be a social asset; it is for the sake not merely of the individual but of the community that laws are enacted and rules enforced for the maintenance of healthy conditions. But so new, comparatively, are considerations of this kind, that only in a few of the best factories is there any approach to a really scientific observance of such conditions as to ventilation, light, warmth, &c., as will serve to promote a high standard of health and efficiency. The provisions of the factory law, Miss Butler thinks, are too general, and fail to cope with the trade dangers characteristic of particular occupations; *e.g.*, a specially dusty trade needs a specially high standard of ventilation. She is also impressed by the need of planning and building works and factories with regard to the nature of the work it is intended to carry on. A third factor appears to her of extreme importance, and this is the practice of "speeding." The workers' pace is kept high by the speed of the machinery, and more than this, among hand-workers and workers who control their machines, systems of pace-setting are combined with piece-rate payments to keep up the speed. In several "stogy," or, as we should say, tobacco works, the girl-rollers are stimulated to the highest possible speed by the use of a sliding scale, under which they are paid \$·13½ per 100 when 400 stogies are rolled from 1 lb., but only \$·10 when 300 are rolled. "The nervous strain under these conditions has no inconsiderable share in causing positive breakdown." (P. 366.) "Women and the trades" ought to find a place on the shelves of every public library, and in the libraries of manufacturers and of all students of industrial conditions. It is to be hoped that it will stimulate the production of studies equally thorough and comprehensive in our own country. B.L.H.

15.—*Modern Tariff History. Germany, United States, France.* By Percy Ashley. Second edition, x + 447 pp., 8vo. London: John Murray, 1910. Price 10*s.* 6*d.* net.

In the interval since the first edition of this book, a notice of which appeared in the *Journal* for March, 1905, "Tariff History" has not stood still; and three chapters have been added, one to each of the three sections of the work, dealing respectively with the Commercial Treaties and the New Conventional Tariff of Germany of 1906, with the United States Tariff of 1908, and with the French Tariff of 1910. A few fresh pages, bringing the history of economic progress in America down to 1908, have also been incorporated in a previous chapter of the second part, and the bibliography appended to all three portions has been enlarged by the inclusion of literature (mainly of the nature of official publications) issued subsequently to the first edition. The whole work has, as Mr. Ashley tells us in his Prefatory Note, been revised, minor errors have been corrected, the statistics re-cast and extended, the narrative in the text made more complete, and the references in the footnotes augmented. The book, indeed, without losing any of the characteristics which we ventured formerly to commend to the favour of its readers, has been improved; and it is gratifying that the recognition of its many considerable merits has created a demand for this new edition.

It may be pardonable to regard as an improvement a change which the author himself has not noted; for Mr. Haldane's Preface, with which the work was introduced in 1904, is not reprinted in the present issue. We do not, of course, wish to be misunderstood; but at the time we felt as we do now, that the impartiality at which Mr. Ashley himself had aimed (even if, like all writers of strong and clear convictions, he could not keep his mind entirely free from predisposing bias), was much less conspicuously shown in the preface. Nor could we reasonably hope for so impossible an achievement in the pointed moral drawn in that Introduction by an able but avowed protagonist of the fiscal controversy, then as now being waged between active politicians. Interesting and acute as those preliminary observations could not fail to be, the permanent value of Mr. Ashley's work is certainly enhanced rather than diminished by the omission of occasional polemics; and it is to the class of more enduring contributions to economic history that his book is in our opinion entitled to belong.

He has, it may gladly be recognised, shown in the additional chapters which it now contains the comprehensiveness of handling and the fairness of attitude which he happily succeeded in attaining in its earlier shape. He allows, for example, that when the "most favoured nation clause" is accompanied, as it is in German fiscal policy, by specialised classification, its ostensible benefits may, in effect, be withdrawn from a third country which is no party to the actual bargaining. Nor is he less frank or less fair in his statement of the truth that no obvious trace can be discovered in the business experience of the United States of the enervating influence commonly attributed to Protection by Free Traders, while he regards the formation of Trusts as a product of general economic tendencies of the age rather than as the hothouse creation of a tariff. For these and similar reasons his book will continue, we believe, for many years to be read with advantage by disinterested students who are bold enough to hold that they enjoy comparative detachment from the controversies of the hour. It may be studied with no less profit, it may be added, by eager combatants in the fray, if they are not so bigoted as to decline to learn from the experience of other nations, whether it agree or conflict with their own ideas. Nor, indeed, is its present republication more than one perhaps of many signs that the fiscal question, which has been pronounced so often to be dead, is still so much alive as to merit and require renewed assiduous study. L.L.P.

16.—*Arbitrage in bullion, coins, bills, stocks, shares, and options.* By Henry Deutsch, Ph.D. Second edition revised and enlarged. 8vo. London: Effingham Wilson, 1910.

Every new writer on the foreign exchanges knows beforehand that Lord Goschen's book of half-a-century ago is the standard by which nine-tenths of his critics will judge him. Having once used it they have never since used any other. Goschen is still a classical text-book in commercial colleges and schools of Economics. But any practical value the book ever had has almost entirely vanished. Since it was published the science of the foreign exchanges has advanced quite as much as the most progressive of the physical sciences. Some idea of its development may be gathered from the title of the present work, which is the most up-to-date of its kind. It will be observed that Mr. Deutsch enumerates half-a-dozen separate and distinct media in which arbitrage transactions can be carried on, namely, bullion, coins, bills, stocks, shares, and options. If we turn to Lord Goschen's book we shall find that it deals almost exclusively with one of these six media. It practically ignores all the others, and, as regards some of them, it had no choice, because they did not then exist. Bills of exchange were in Lord Goschen's day the principal means of settling balances of international indebtedness, and he dealt with them mainly—it might almost be said solely. His exposition of how these balances of international indebtedness arise is admirably lucid, and will be permanently valuable. Mr. Deutsch does not presume to compete with him there. He leaves that alone, and undertakes only to describe the foreign exchange operations of the present day as they are actually carried on. His first section is devoted to what may be called metallic arbitrage. This involves a detailed account of the principal monetary systems of the world, both gold and silver. The second section treats of arbitrage in bills of exchange, which is now an infinitely more complex subject than it was half-a-century ago. As an appendix to this division the bank returns of the principal European and American banks are analysed, so as to show their influence on exchange rates. The third section—arbitrage in stocks and shares—sketches the great European and American bourses, and shows how their international transactions are conducted. The book concludes with a brief account of the latest form of international arbitrage—that in options, on stocks and shares. Even this intricate and abstruse subject Mr. Deutsch makes interesting to his readers. Though very few of them are ever likely to put their knowledge to a practical test, it is worth having for its own sake. Mr. Deutsch's "Arbitrage" is gradually becoming the business man's handbook, and though as yet it may be over the head of the average student, it will be a good ideal for him to try to live up to.

W.R.L.

17.—*Medical examination of schools and scholars.* Edited by T. N. Kelynack, M.B. 434 pp., 8vo. London: P. S. King and Son, 1910. Price 10*s.* 6*d.* net.

"The aim of this book is essentially a practical one. It seeks to provide a complete guide for school medical officers." Some books are exceedingly difficult to assess, and one composed of thirty-two separate articles—apparently unpaid contributions—by as many different writers presents unusual difficulty. The chapters sketch out the position of school hygiene as developed in England under the interpretations of the Administrative Provisions Bill provided by the Board of Education and also as practised abroad. These sketches form a useful record, but as a scientific treatise or "guide for school medical officers" the work is imperfect. On looking up such a subject as the care of crippled children, in which this country excels, there is not only no chapter, but no reference to it. And yet there are thousands of such children being educated in London and the provinces. Help on such topics as fatigue, the assessment of mental capacity, the sizes of seats or desks, artificial illumination, or what measure of deafness unfits a child for the ordinary school is sought in vain. The earlier articles tend to platitudes on official circulars. There are, however, some good chapters, notably an excellent account of German work by Dr. Moritz Fürst, a careful, if somewhat narrow, account of the school clinic and its purpose by Dr. Williams, of Bradford, and the articles by Dr. Foggin on eyesight, and Dr. Howarth on organisation. Lack of experience in school details and the educational aspect of their subjects detract from otherwise well-informed articles on aural matters, mentally defective children, the medical examination of secondary school girls, and the school and public health service. The book, although diffuse and expensive, is an industrious compilation and contains extensive bibliographies which perhaps constitute its chief claim to be a work of reference in either statistical or hygienic matters.

J.K.

18.—*The rural life problem of the United States.* By Sir Horace Plunkett. xi + 174 pp., 8vo. New York: The Macmillan Company, 1910. Price 5*s.* net.

The distinguished author of this little volume has so high a record for sound sense and administrative ability, and has left such an abiding mark on the rural economy of his native Ireland, that one turns with keen interest to learn the purport of any criticism, warnings or advice he may offer on the country life of the great transatlantic Republic, which he knows so well as to call it his second home. It may be premised that the book is in no sense statistical, and if it claims a notice here, that is due to the circumstance that the theories it raises, and the sociological conditions it describes, constitute inducements to the student to supplement the rhetorical picture here drawn of rural America in the twentieth century by a further research into the available numerical data on which the indictment rests that all is not well with the American farmer of our time.

To many it will seem a revelation to learn that there is a problem of this nature at all in a land to which the struggling European agriculturist is wont to look as the origin of the flood of competition which has lowered the value of his produce, and paralysed his efforts to raise, profitably at least, the more bulky of his crops, by a seemingly endless stream of ocean-borne surpluses of cheaply raised forms of food. Had Sir Horace Plunkett cared to play the statistician as well as the philosopher, he could doubtless have found in the census records and official returns of the United States ample justification for his postulate that, even in America, the town has begun to dominate the country, with evil effects; that urban and industrial interests are draining the social life of the Western farmer of its best elements, and distorting the relations of a healthy rural system. Permanent abiders in the field, contented to improve their cultivation and establish a solid local society more valuable to the State than the feverish business life of the cities, are, it seems, giving place over a large area of the West to a race of land speculators and passing farmers exploiting by a cheap and exhausting husbandry the land they have secured, and passing on to new fields as the old become less responsive to their generally unskilled efforts.

We may think that the author has taken too narrow a view of the scope of excessive and baleful urbanisation in attributing the prevalence of this feature of our day to the English-speaking races alone. A reference to the population records of quite other races suggests that the phenomenon is far more world-wide. Be this as it may, what concerns us here is to note the remedy for which Sir Horace Plunkett so earnestly pleads—the restoration of better methods of rural business, and the elimination of reckless individual competition—by applying to the country the methods of combination and co-operation which have aided the prosperity of the towns. He would substitute, however, for the mere collective application of capital—typified in the joint-stock company—the wider co-operative forms of trading by grouping, not capital only, but personal effort, in a form of neighbourly organisation which should at once give the farmer a steadier and better market, and train him to the discipline of a higher social life. Following out Mr. Roosevelt's policy of a double reform, based on a better "conservation" of rural resources, and a general improvement of "country life" conditions, Sir Horace Plunkett urges the need of a great agricultural organisation society, doing for the vast surface of America the suggestive and educational work which his similar enterprise in Ireland is attempting. But he further asks for the establishment of a permanent institute for economic research and the advancement of rural interest, which may utilize and co-ordinate existing agencies, and lift the American agriculturist to a less barren social life and a materially improved financial status more akin to that enjoyed by the prosperous urban citizens of what he, nevertheless, still claims to be "the most progressive country in the world."

P.G.C.

19.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Barker (*J. Ellis*). Great and Greater Britain. The Problems of Motherland and Empire, political, naval, military, industrial, financial, social. Second and enlarged edition. xiii + 587 pp., 8vo. London: Smith, Elder and Co., 1910. Price 10*s.* 6*d.* net.

[The second edition of this book has been considerably enlarged, although the author points out that it is impossible, within the compass of a single volume, to deal in detail with all the problems on which he touches. There is a good index.]

Bellom (*Maurice*). L'assurance des employés et des travailleurs indépendants. 29 pp., 8vo. Paris, 1910.

Besse (*Pierre*). La crise et l'évolution de l'agriculture en Angleterre de 1875 à nos jours. Essai d'histoire économique. xv + 390 pp., 8vo. Paris: Felix Alcan, 1910. Price 10 fr.

Biach (*Dr. Rudolf*). Thomas Mun. Englands Schatz durch den Aussenhandel. Nach der Originalausgabe (1664) ins Deutsche übertragen. 211 pp., 8vo. Leipzig: G. Freytag, 1911.

[A translation of Mun's well-known book *England's treasure by foreign trade*, one of the earliest and best books on the mercantile system.]

Bisschop (*W. R.*). The Rise of the London Money Market, 1640-1826. With a preface by H. S. Foxwell, M.A. 256 pp., 8vo. London: P. S. King and Son, 1910. Price 5*s.* net.

[A translation of a book which appeared in Dutch in 1896. It throws considerable light on an obscure and difficult period in the history of English banking.]

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* See also "Additions to the Library," page 154, *sqq.*

Bochard (*A.*). L'évolution de la fortune de l'État. Ouvrage récompensé par l'Institut de France. (Académie des Sciences morales et politiques.) viii + 334 pp., 8vo. Paris: Giard and Brière, 1910. Price 6 fr.

[An economic study of State-owned industries and of their advantages and disadvantages to the nation at large. The book is divided into five sections each dealing with different phases of the subject, and there is an index in addition to an analytical table of contents.]

Brace (*Harrison H.*). Gold Production and Future Prices: an inquiry into the increased production of gold and other causes of price changes with a view to determining the future of prices. viii + 145 pp., 8vo. New York: The Banker's Publishing Co., 1910.

Chapman (*Prof. S. J.*). Home Work. Read before the Manchester Statistical Society, January 19, 1910. 32 pp., 8vo. Manchester, 1910.

[A subject of much interest which has provoked legislation. The author's endeavour is to give the public a more exact conception of the subject in all its social and economic bearings.]

Del Mar (*Alex.*). The Cost of Living; Has it Risen, and Why? 12 pp., 8vo. 1910.

[The author, who was formerly Director of the U.S.A. Bureau of Statistics, considers that the increased cost of living in the United States is largely due to the tariff and to the weight of taxation and the expansion of the currency.]

Dolia (*Giovanni*). Alcuni documenti sulla distribuzione del patrimoni secondo l'età in Sardegna al principio del secolo xix. 11 pp., 8vo. Cagliari: G. Dessi, 1910.

[A short statistical study of the ages of inheritors of property in Sardinia.]

Dougharty (*Harold*). Life Assurance Simplified. Practical and Elementary Notes for Students and the General Reader . . . 175 pp., sm. 8vo. London: The Insurance Publishing Co., Ltd., 1910. Price 1*s.* net.

[Mainly compiled from articles which appeared in the Press.]

Eliot (*Charles W.*). The Future of Trades Unionism and Capitalism in a Democracy. Being the Larwill Lectures for 1909. 128 pp., sm. 8vo. London: G. P. Putnam's Sons, 1910.

[Two lectures delivered at Kenyon College in 1909.]

Escher (*Franklin*). Elements of Foreign Exchange. A Foreign Exchange Primer. viii + 160 pp., 8vo. New York: Banker's Publishing Co., 1910.

[Written with the idea of explaining the working of foreign exchanges to those who have not the time to study the more important text-books on the subject.]

Eversley (*Lord*). Commons, Forests, and Footpaths. The story of the battle during the last forty-five years for public rights over the Commons, Forests and Footpaths of England and Wales. (Revised edition.) xxi + 356 pp., 8vo. London: Cassell and Co., Ltd., 1910.

[This book is the outcome of the wish of the Commons Preservation Society to commemorate Lord Eversley's long services in connection with the preservation of open spaces. Lord Eversley thought that an edition of his book on Commons and Forests, brought up to date and published in a more popular form, would be the most suitable form of commemoration. Hence the present volume, which is a valuable record of a movement which has been of inestimable value to the community.]

Fernow (*Bernhard E.*). A brief history of Forestry in Europe, the United States, and other countries. 438 pp., 8vo. Toronto: The University of Toronto. 1910.

[This book is based on a course of lectures delivered at Yale University.]

Gantt (*H. L.*). Work, Wages, and Profits, their influence on the cost of living. (Works management library.) 194 pp., 8vo. New York: The Publishers, "Engineering Magazine," 1910.

[The author has for many years been closely interested in labour management in the United States, and this book, which is the result of his experiences, is intended to show that by the application of scientific methods to labour problems many of them may be solved with due consideration to employers and employed.]

Gehrke (*Dr. Franz*). Bremens Warenhandel und seine Stellung in der Weltwirtschaft. 126 pp., 8vo. Jena: G. Fischer, 1910. Price 3 marks.

[An economic and statistical study of the trade of Bremen and of its growth in recent years.]

Günther (*Franz*). Die allgemeine Teuerung. Ursachen und Bekämpfung vom Standpunkte der Land- und Forstwirtschaft, der Industrie, des Handels und der Konsumenten. 39 pp., 8vo. Vienna: Wilhelm Frick, 1910.

[A short study of the causes of the increased cost of living in Austria and other countries.]

Hart (*David Berry*). Phases of Evolution and Heredity. xi + 259 pp., 8vo. London: Rebman, Ltd., 1910. Price 5*s.* net.

[An account is given of Mendel and Mendelism, and of other phases of this subject.]

Helfferich (*Dr. Karl*). Geld und Banken. Teil 1. Das Geld. 2 Auflage. x + 600 pp., 8vo. Leipzig: C. L. Hirschfeld, 1910. Price 17*s.* 6*d.*

[A valuable treatise on money and banking, though the present volume deals only with money. The first portion of this book is historical and the second theoretical, and the treatment of the subject throughout appears to be thorough.]

Hinckes (*Ralph T.*). Seven years of the Sugar Convention, 1903-10: a vindication of Mr. Chamberlain's imperial and commercial policy. 53 pp., sm. 8vo. London: P. S. King and Son, 1910. Price 3*d.* net.

Hobson (*J. A.*). The Industrial System: an inquiry into earned and unearned income. New and revised edition. xx + 338 pp., 8vo. London: Longmans, Green and Co., 1910. Price 7*s.* 6*d.* net.

[A new edition, embodying some important alterations. The first edition was reviewed at length in the Society's Journal for September, 1909.]

Jackson (*Cyril*). Unemployment and Trade Unions. With preface by Rt. Hon. Viscount Milner, P.C., &c. 92 pp., 8vo. London: Longmans, Green and Co., 1910. Price 1*s.* 6*d.*

[Deals with the causes of unemployment and with suggested remedies. Mr. Jackson's object is to strengthen the Unions, where they already exist, and to make them, in Lord Milner's words, "the mainspring of a systematic national effort to deal with the problem of unemployment."]

Jevons (*W. Stanley*). The State in relation to Labour. Edited with an introduction by Francis W. Hirst. 4th edition. 174 pp., 8vo. London: Macmillan and Co., 1910. Price 2*s.* 6*d.*

[This work first appeared in 1882, and cannot well, as Mr. Hirst observes, be "brought up to date." What has been done, however, is to indicate by brief notes the further trend of legislation on the particular lines observed by Jevons, more especially as regards factories and trade unions.]

Kinley (*David*). Money. A study of the theory of the medium of exchange. xviii + 415 pp., sm. 8vo. New York: Macmillan and Co., 1909. Price 5*s*. net.

[An attempt to present a systematic exposition of the theory, or scientific principles, of money. The author is not in accord with certain other writers in regard to the influence of credit, nor the relation of the quantity of money to its value. The book contains a useful bibliography and index.]

Lamotte (*Armand de*). La Femme en ville et à la campagne. Salaires et conditions diverses. Deuxième édition. Étude sociale. ix + 102 pp., sm. 8vo. Paris: Marcel Rivière and Co., 1910. Price 1 fr. 50 c.

[A study of the social condition of female manual workers in town and country in France.]

Laughlin (*J. Laurence*). Latter-day Problems. 301 pp., 8vo. New York: Charles Scribner's Sons, 1909. Price $1 50c.

[A series of economic studies on questions of the day. The book is divided into ten chapters, the first six of which deal with methods to be applied for the improvement in the condition of the poorer classes, and the other chapters with valuation of railways, and subjects of interest to the banking public.]

Leseine (*L.*), and *Suret* (*L.*). Introduction mathématique à l'étude de l'Économie politique. vi + 190 pp., sm. 8vo. Paris: Felix Alcan, 1911. Price 3 fr.

[An endeavour to supply a want which is felt by students of the mathematical theory of political economy. The book is intended to serve as an introduction to the more erudite works of Cournot, Walras and others.]

Life and Labour in Germany. Report of the Labour Party and Trade Union Commission on Wages, Hours of Employment, Working Conditions, and the Standard of Living. June, 1910. 72 pp., 8vo. Woolwich: Labour Representation Newspaper Printing and Publishing Co., Ltd. Price 3*d*.

[The Commission visited some of the principal towns in Germany, and sections of the Commission made special inquiries in regard to particular localized trades.]

Lifschitz (*Dr. F.*). Wertzuwachssteuer Theorie und Praxis. 32 pp., 8vo. Bern: Max Drechsel, 1910. Price 1 mark.

[A short economic study on the working of the Super-tax in Switzerland.]

Loubet (*Émile*), *S. A. Hussein Hilmi Pacha*, *André Lebon*, *Georges Blondel*, *Raphael-Georges Lévy*, *A. Raffalovich*, *Charles Laurent*, *Charles Picot*, *Henry Gans*. Politique Budgétaire en Europe: Les tendences actuelles. Conférences organisés à la Société des anciens élèves de l'École libre des Sciences politiques.—Les Finances de l'Empire allemand et la réforme de 1909.—La réforme financière en Turquie.—L'Évolution de la politique financière anglaise et la crise récente.—L'Évolution budgétaire en Russie.—Etude comparative du budget de la France et de ces budgets. xxiii + 316 pp., 8vo. Paris: Felix Alcan, 1910. Price 3 fr. 50 c.

[The publication of this book comes opportunely at a time when European Governments have difficulties in framing their budgets in the face of increasing expenditure. It comprises a series of lectures dealing with the financial position of Germany, Turkey, the United Kingdom and Russia, concluding with a comparison, by M. Raphaël-Georges Levy, of the budgets of these countries with that of France.]

MacLean (*Annie Marion*), Ph.D. Wage-earning women. xv + 202 pp., 8vo. New York: Macmillan and Co., 1910.

[An inquiry into the wages, hours of labour and social conditions of women employed in American cities and in fruit and hop picking.]

Mallock (*W. H.*). The Nation as a business firm. An attempt to cut a path through jungle. xi + 268 pp., 8vo. London: A. and C. Black, 1910. Price 3*s.* 6*d.* net.

[Certain of the conclusions in this book have already appeared in the press and were the subject of some criticism. The book deals with the growth and diffusion of wealth among the community during the past century, and analyses the economic origins of the respective incomes of the various classes of the population. The author admits that many of his conclusions are based on incomplete information.]

Mignon (*F.*). Every man his own financier. A practical handbook. xvi + 343 pp., sm. 8vo. London: T. Werner Laurie, 1910. Price 6*s.* net.

[An attempt to present the principles of finance in a popular manner.]

Milnes (*Alfred*). From Gild to Factory. A first short course of economic history. Second edition. vi + 84 pp., sm. 8vo. Macdonald and Evans, 1910.

Mortara (*Giorgio*). Le Popolazioni di Basilicata e di Calabria all' inizio del secolo ventesimo. 75 pp., fol. Rome: G. Bertero, 1910.

[A study of the general vital statistics of the Provinces of Basilicata and Calabria during the last twenty years.]

——— Indagini sulla delinquenza in Italia. I. La recidività. II. La delinquenza in rapporto all' età. III. La delinquenza in rapporto allo stato civile. 95 pp., 8vo. Torino: Unione Tipografico-Editrice Torinese, 1910.

[A statistical study of crime in Italy.]

Nouel (*René*). Les sociétés par actions. La réforme. Préface de Pierre Baudin, sénateur. xi + 332 pp., sm. 8vo. Paris: Félix Alcan, 1911. Price 3 fr. 50 c.

[A study of recent legislation in France in regard to joint stock companies and its relative inability to redress certain defects in their working. The author suggests reforms which he believes would minimise many of the defects in question.]

Pearson (*Prof. Karl*). Supplement to the Memoir entitled: The Influence of Parental Alcoholism on the Physique and Ability of the Offspring, a reply to the Cambridge Economists. 26 pp., 8vo. 1910.

——— Nature and Nurture the problem of the future. Eugenics Laboratory Lecture, Series IV. 31 pp., sm. 8vo. London: Dulau and Co., 1910.

Picard (*Roger*). Les Cahiers de 1789 et les Classes ouvrières. Systèmes et faits sociaux. 276 pp., 8vo. Paris: Rivière and Co., 1910. Price 6 frs.

[An interesting study of the petitions of grievances submitted to the Government by the commercial and industrial classes in France on the eve of the Revolution of 1789. They show to what extent the industrial activities of the country were hampered by the varied and numerous laws and restrictions then in force.]

[Poor Law Commission.] The Minority Report: a Criticism. (A summary of which appeared in "The Times" of June 19, 1910.) 32 pp., 8vo. London: P. S. King and Son, 1910. Price 6*d.* net.

Powall (*Ellis T.*). The mechanism of the City: an analytical survey of the business activities of the City of London. v + 172 pp., 8vo. London: P. S. King and Son, 1910.

[In this book, which is based on a course of lectures given at the London School of Economics, the author endeavours to exhibit simply yet accurately "the essential basis of the activities of the City."]

Prion (*Dr. W.*). Die Preisbildung an der Wertpapierbörse insbesondere auf dem Industrieaktienmarkt der Berliner Börse. xii + 216 pp., 8vo. Leipzig: Duncker and Humblot, 1910. Price 7 marks.

[An economic and statistical study of the changes in prices of securities, especially those of an industrial character, quoted on the Berlin Exchange.]

Rothkegel (*Walter*). Die Kaufpreise für ländliche Besitzungen im Königreich Preussen von 1895 bis 1906. (Staats- und Sozialwissenschaftliche Forschungen. Herausgegeben von Gustav Schmoller und Max Sering (Heft 146.) x + 356 pp., 8vo. Duncker and Humblot, 1910. Price 10 marks.

[A statistical study of changes in the value of land in town and country in Prussia in recent years.]

Scott (*William Robert*). The Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720. Vol. 2. Companies for Foreign Trade, Colonisation, Fishing and Mining. x + 504 pp., 8vo. Cambridge: The Cambridge University Press, 1910. Price 15*s.* net.

[The first volume of this valuable historical work will be issued later. The present volume is a record of the progress of several groups of companies formed for foreign trade, colonising and kindred objects, fishing and the extractive industries.]

Smart (*William*). Economic Annals of the Nineteenth Century, 1801-20. xxxv + 778 pp., 8vo. London: Macmillan and Co., 1910. Price 21*s.* net.

[The author in the course of his economic labours has repeatedly felt the want of an economic history of the working world in the nineteenth century. "Few realise," he says, "that the whole framework of modern life is economic" and that this framework "began with machinery and steam." It is the intention of the author to devote the remainder of his life to the collection and arrangement of the material for the historian when he shall appear. The present volume deals with the first twenty years of the century.]

Smith (*J. C.*). Legal Tender Essays. xviii + 285 pp., 8vo. London: Kegan Paul, Trench, Trübner and Co., Ltd., 1910. Price 3*s.* 6*d.* net.

[Based on essays "dealing with the problems of (i) the equitable settlement of inter-temporary transactions or dealings within the Nation, and of (ii) the re-establishment of permanently satisfactory and stable external exchange relations between the peoples of the gold-using West and of the silver-using East."]

Steiger (*Dr. J.*). Die Wertzuwachssteuer (Besteuerung der Liegenschafts gewinne) in Deutschland und in der Schweiz. 56 pp., 8vo. Zürich: Institut Orell Fussli, 1910.

[A short study of the working of the super-tax in Germany and Switzerland.]

Trivett (*John B.*). Australasian Association for Advancement of Science. Comparative Legislation relating to the Industrial Classes. 23 pp., 8vo. Brisbane, 1910.

[A brief review of legislation in New South Wales in the last twenty years showing its trend especially in regard to the industrial classes.]

Verrijn Stuart (*Dr. C. A.*). Inleiding tot de beoefning der Statistiek. Eerste Deel. De statistische methode en hare toepassing op het gebied der demografie. La. 8vo. Haarlem: de Erven F. Bohn, 1910.

[An introduction to statistics which, it is to be hoped, will be translated from the original Dutch.]

Vrooman (*Carl S.*). American railway problems in the light of European experience or Government regulations *versus* Government operation of railways. vii + 376 pp., sm. 8vo. Oxford: The Oxford University Press. Price 6*s.* net.

[A study of the existing conditions in the United States and of the broader economic, political and social aspects of the American railway problem.]

Wacha (*D. E.*). A Financial Chapter in the History of Bombay City. 224 pp., 8vo. Bombay: The "Commercial Press," 1910.

[Deals with a wave of speculation that swept over Bombay about fifty years ago and caused serious financial losses to many institutions and persons.]

Wassermann (*Dr. Rudolf*). Begriff und Grenzen der Kriminalstatistik. Eine Logische Untersuchung. (Kritische Beiträge zur Strafrechtsreform. Heft 8.) x + 112 pp., 8vo. Leipzig: Wilhelm Engelmann, 1909. Price 4 marks.

[A study of criminal statistics and of their limitations in the general service of criminology.]

Webb (*Catherine*). Industrial Co-operation: the story of a peaceful revolution. Being an account of the history, theory, and practice of the Co-operative movement in Great Britain and Ireland. Prepared for the Co-operative Union Association. With a preface by L. L. Price, M.A. Fourth edition (revised). xxii + 287 pp., 8vo. Manchester: Co-operative Union, Ltd., 1910.

[In issuing a new edition of this book opportunity has been taken of perfecting its plan. The first five chapters deal briefly with the historical outline of co-operation, while in the remaining chapters the subject has been examined in more detail. Similarly, the appendices and statistical tables and bibliography have been brought up to date.]

Webb (*Clarence A.*). Valuation of Real Property. A Guide to the Principles of Valuation of Land and Buildings, &c., for various purposes, including the Taxation of Land Values. With numerous examples. xii + 332 pp., 8vo. London: Crosby Lockwood and Son, 1910. Price 7*s.* 6*d.* net.

[A new edition including, among other additions, a chapter on the new land values taxation.]

Weber (*Dr. Christ. Leop.*). Die Anfänge der Statistik in der ehemaligen Grafschaft Mark bis zum Jahre 1609. 104 pp., 8vo. Witten: Markische Druckerei und Verlags-Anstalt Aug. Pott, 1910.

[A contribution to the statistical history of finance and population in the Duchy of Mark in the early seventeenth century.]

Withers (*Hartley*). Stocks and Shares. xi + 371 pp., 8vo. London: Smith, Elder and Co., 1910. Price 7*s.* 6*d.* net.

[The author in this readable volume endeavours to describe, for the benefit of those who follow in the daily press the movements of securities, the working of the money market in its many intricacies. The book is divided into twelve chapters, and there is a glossary and a full index.]

Wood (George Henry). The history of wages in the cotton trade during the past hundred years. 162 pp., 8vo. London: Sherratt and Hughes, 1910. Price 3s. net.

[Mr. Wood's series of papers in the *Journal of the Royal Statistical Society*, for which he was awarded the Society's Guy Medal in silver, are here republished.]

Wood (Sir Henry Trueman). Industrial England in the middle of the Eighteenth Century. ix + 197 pp., sm. 8vo. London: John Murray, 1910. Price 5s. net.

[This book is the expansion of a paper read before the Society of Arts, in which the author described the industrial condition of the country at the date of the Society's foundation in 1754. This period just preceded the Industrial Revolution, the prime factors of which were the introduction of machinery and the steam engine. The different industries are briefly described, yet sufficient technical detail is given to afford a comparison between their condition then and at the present time.]

France. Ministère du Travail et de la Prévoyance Sociale. Répertoire technologique des Noms d'Industries et de Professions Français-Anglais-Allemands, avec notices descriptives sommaires suivi de trois listes alphabétiques des noms Allemands, Anglais et Français. xxii + 462 pp., la. 8vo. Paris: Berger-Levrault and Co., 1909. Price 30 frs.

[This publication is of great international importance, and its compilation is largely due to the efforts of the International Statistical Institute. It will be of great value to students of the comparative industrial conditions in the counties concerned.]

CORRESPONDENCE.

Influence of Parental Alcoholism.

To the Editors of the "Journal of the Royal Statistical Society."

SIRS,—In a "Supplement to the memoir, entitled *The Influence of Parental Alcoholism on the Physique and Ability of the Offspring,*"[1] Professor Karl Pearson replies to criticisms on the memoir which were put forward by Dr. Alfred Marshall in *The Times* and by myself in a review which appeared over my initials in the July number of the *Journal of the Royal Statistical Society.* As Professor Pearson deals with this review in considerable detail, and as he involves himself, in my opinion, in serious errors both of fact and of argument, I shall be glad of the opportunity to make a few remarks, supplementary to my review, and having reference to this pamphlet.

The following is a brief summary of the main grounds on which, in the July number of this Journal, I criticised Professor Pearson's results. To trace the effects of parental alcoholism on offspring, he took two sets of instances. In the first all the families were alike in having one feeble-minded offspring. In the second they were all alike in living in a single district of Edinburgh, and I gave reasons in my review for thinking that the evidence relating to this district showed slum conditions and pointed to its being amongst the lowest in the town. I concluded that families one member of which is feeble-minded, and that families who live in the lowest district of a large town, are likely to be in some respect sub-normal. Those who are not drunken will probably have, many of them, some other defect not much less serious. I held, therefore, that neither investigation threw much light on the general problem of how bad a disease, in its effects on offspring, alcoholism is. They showed only, if they showed anything, that there are other affections not much less serious. I summed up as follows: As in the Manchester case, so *on the whole* in the Edinburgh case, the authors are comparing drunken stock with *bad* sub-normal sober stock, and find, naturally enough, that there is not much to choose between them.

I did not anticipate the line of argument which Professor Pearson has followed in his reply, and I did not realise that he seriously held that his study of the feeble-minded families of Manchester threw appreciable light on the *general* problem. He endeavours to controvert, it is true, my description of the district of Edinburgh, maintains that I have exaggerated its badness,[2] and argues that it may not be worse than the slums of other large towns.[3] But this is not his main contention. He holds that if everything which I said on this score were true, it would be of no consequence, for I have not shown that his sampling is other than random *within the field of his investigation, i.e.*, within the group of feeble-minded families in Manchester and within the low district of Edinburgh. There is very little to choose, he says, between the drunken parents and the sober; and this he claims is all that his argument requires. The following quotations show clearly enough that this is his main contention:—

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[1] Published by Messrs. Dulau and Co. Price 1*s.*

[2] It was an important part of my argument to emphasise the stunted nature of the children of the district as a whole. I summarised the figures, therefore, for *all* ages and for *all* the children. Amongst these I referred to those of 14 years of age. Professor Pearson endeavours to evade the real issue and to bring discredit on the *whole* comparison, because there were only 5 boys and 2 girls aged 14. To my charge that he ignored important facts regarding the

"Will it be believed that these two distinguished economists (*i.e.*, his critics) make not the slightest endeavour themselves to show from the data that there is any differentation whatever between the Edinburgh temperate and intemperate sections? All they attempt is to show that *both* sections alike are on a lower plane[4] (—than the average working classes of non-manufacturing towns?—no, merely than what *they suppose* the working-class population of such towns to be. It does not seem to me that they

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development of *all* the children, he replies as follows:—"Trained anthropometrical statisticians would, however, under any circumstances ignore results based on averages (!) of 5 boys and 2 girls who were left in a public elementary school at the age of 14." In any case, the scantiness of the *data* is more damaging to Professor Pearson, who seeks to derive positive results from them, than to his critics, who do not. I add the following quotation from the Edinburgh *Report*, in corroboration of my original contention, the substance of which remains, I think, unanswered:—"It has been repeatedly noted by Dr. Chalmers and others that Scottish boys and girls are usually above the average height of their neighbours south of the border, so it need not cause surprise that country children and well-nourished town children exceed the standard heights in a noticeable degree. *It gives a sadder emphasis to the lesser heights of the children of the selected school, many of whose chances of healthy growth are apparently spoiled for life before they begin to attend school, by bad conditions of the mother's life before and after the birth of the children.*"

[3] Professor Pearson heaps much contumely upon me (see p. 17) because I have not assumed, as he does, that the methods of housing which exist in Edinburgh are similar to those which exist in Glasgow. I argued that a district of *Edinburgh*, in which 72 per cent. of the families live in one- or two-roomed tenements, must be a low district of the town. Professor Pearson points out, truly enough, that this test would not be sufficient if it referred to the housing system of *Glasgow*. But why has Professor Pearson gone out of his way to take the figures for Glasgow when the investigation refers to Edinburgh? The figures for both are equally available in the Census returns. In Glasgow, 70 per cent. of all the families lived in one- or two-roomed tenements, but for Edinburgh the corresponding figure is 48 *per cent.* My argument—that a district of *Edinburgh* in which 74 per cent. live under such conditions must be one of the lowest in the town—was, therefore, perfectly valid. The report itself corroborates this (see p. 3, where attention is drawn to the serious overcrowding in the selected district).

[4] The preceding sentence gives a correct account of my argument. The passage which I have placed between brackets is a digression from the matter in hand, but it is better to give the quotation in full.

realise what this class really is, although a study of Rowntree's, *York*, and Booth's, *London*, might have helped them to a juster view). But if we were to admit that the Edinburgh sample could be described in the language adopted by Professor Marshall and Mr. Keynes, what would follow? Our results would be wholly unaffected *until these economists had demonstrated a differentiation in the two classes of the population dealt with*" (pp. 7 and 8).

"They tell us that we have not taken a 'random sample of the population.' Such a term we, of course, use in a technical sense—namely, a population in which there has been no *differential* selection of the two sections bearing the character which we are discussing, *i.e.*, the use of alcohol" (p. 13).

"They content themselves with asserting that the population is a 'low grade' one, which has no logical bearing on the problem in hand" (p. 22).

These passages, particularly the last, explain the nature of the difference of opinion which leads Professor Pearson to think evidence valuable which his critics think worthless. It is a question, not of facts, but of the nature of valid argument which is in dispute. He thinks that in a test experiment the alcoholic group should be comparable with the sober group in respect of wages, professions, social status and so forth, *after* they have become alcoholics. It is because the Manchester and Edinburgh investigations do not, so far as he can see, seriously infringe these conditions that he is satisfied with them. But let us apply his method in detail to the example, suggested by Professor Marshall, of the patients who come for treatment to a hospital. They are divided into two classes—those who are suffering from *delirium tremens*, and the rest. We find that since they contracted their diseases they have lived in the same neighbourhood, have paid about the same rent, have received an equal amount of charitable aid, and have succeeded in earning about the same wages. Thus the sample is, in Professor Pearson's "technical sense," random within the field of the investigation. We find also that the death rate amongst those suffering from *delirium tremens* is below that of the rest. We reach, therefore, on Professor Pearson's principles, the interesting and important conclusion that *delirium tremens* prolongs life, or—if we are in a cautious mood and the death rate from it is not much below the average of the hospital—that it does not perceptibly shorten it. To critics who point out that the population is a "hospital one," we reply that this "has no logical bearing on the problem in hand," since there has been no differential selection amongst the patients of the hospital.

The following, therefore, must be the conclusion which makes an argument of this type[5] appear plausible to Professor Pearson in the case of the Edinburgh slum. If the Edinburgh drunkards were on a par with the other inhabitants of the district, *before they drank or if they had not drunk*, the investigation, although it would not

[5] It should be added that Professor Pearson does not follow this argument with *complete* consistence throughout his pamphlet, and he will be able to point to other passages incompatible with those which I have quoted. But this will not prove that I have quoted incorrectly.

conclusively solve the general problem, would certainly possess value. Professor Pearson seems to think that he must show, not this, but that the drunkards are on a par with the other inhabitants of the district *after the drunken habits have been contracted.* In showing that this false condition is satisfied, he has gone far towards proving that the true condition is *not* satisfied.[6] Let us return to the example of the hospital. If the sufferers from *delirium tremens* had entered the ward free from it, but in much the same state of health in other respects as the other patients, and had acquired it while in the ward through the consumption of invalid port, then the lower death-rate in their case would be some evidence of the efficacy of invalid port, and would well deserve the attention which the "Licensing World" has been recently paying to Professor Pearson's memoir. Only if the drunkards would have been in the slum anyhow could the argument from the Edinburgh case have been valid; and, while it is, of course, impossible to know for certain whether or not this was the case, it is surely a good deal less likely than not.

I do not know that it is worth while to elaborate the point much further. There is a presumption, which I do not think Professor Pearson questions, that drunken habits depress the social status of a family, and drive them into a lower district than that family would inhabit if they were sober. There is also a presumption, if a family is sober and lives in a low district, that they have been driven there by some other weakness of body or character, although exceptions will, of course, be found. An examination of the *Report* completely corroborates this expectation. There is a presumption, therefore, that the sober inhabitants of a low district are inferior to what the drunken inhabitants of the same district would have been if they had kept from drink. It is for this reason that the lowness of the district is vitally relevant to the argument. The example of the hospital is precisely parallel. There is a presumption that the other patients are in worse health than the sufferer from *delirium tremens* would have been if he had kept sober.

So far we have been mainly concerned with matters of *argument*, but there is one point of *fact* to which it seems worth while to make some reference. It is not closely connected with the preceding discussion, but Professor Pearson lays great stress on it in his pamphlet. In the controversy between Professor Pearson and Dr. Marshall the question arose as to whether the drunken earned *on the average* as high wages even as the sober inhabitants of the low district. Professor Pearson having asserted that there was not a difference of more than 1*s.* a week, Dr. Marshall suggested that this made no allowance for the casual and irregular nature of the work of many drunkards. Professor Pearson then drew up a table, reprinted on pp. 10 and 11, which was intended to support the statement in his original memoir that "the average wage of a drinker is 25*s.* 6*d.*, and of the temperate 25*s.* 5*d.*" As there are no sufficient *data* in the original report on which such a conclusion could be based, it was at first difficult to make out how Professor Pearson had arrived at these figures. I am still not clear as to how he reaches the averages of 25*s.* 6*d.* and 25*s.* 5*d.* Either he has followed the same method as in the table on pp. 10 and 11 (which will be dealt with immediately) and has attributed to irregular or unemployable workmen the wages they would have received if they had not been irregular, or else (as his actual wording[7] makes more probable) he has simply ignored all those cases in which, on account of irregularity or for some other reason, no average wages were recorded in the report. In either case he has *not* made allowance for casual workers,[8] and his comparisons do not apply, as he suggests, to all drinkers and to all temperate workers, but only to those of them whose average wages are accurately known; and Dr. Marshall's criticism remains unanswered.

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[6] Professor Pearson, writing to the *Daily Chronicle* (Nov. 1, 1910), explicitly claims that he has proved in this pamphlet that, what I term the *false* condition is satisfied. He has shown, he says, that "the sober and the alcoholic followed the same trades, got just the same wages, and lived in the same houses."

The method by which Professor Pearson has compiled the table on pp. 10 and 11, it will be worth while to describe in detail. The table consists of a number of items such as the following:—Chimney sweeps (17*s.* 4*d.*; S 0, D 7), railway porters (28*s.*; S 7, D 2),[9] &c., with this explanation: "In each case the average of the recorded wages of the individuals following that trade is given. S = sober, D = drinks, and the numbers following these letters give the number of each type." The reader would naturally suppose that these wages refer to the same individuals as those which are enumerated under the headings S and D. But this is not so. The wages are copied out in nearly every case from the table given in the original report, in which the wages are averaged *for those cases in which the data exist.* Professor Pearson applies them to *all* cases, regardless of whether the *data* exist. In the case of the seven chimney sweeps, for example, the average, 17*s.* 4*d.*, is obtained from the *three* chimney sweeps whose average wages (varying from 6*s.* to 30*s.*) were known. Professor Pearson's total of seven chimney sweeps is obtained by including in addition (without modifying the average wage) one chimney sweep whose average wage was unknown, and three sweeps (which may be a distinct occupation from that of chimney sweep), of whom the first was in prison, the second earned

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[7] His actual words are: "after allowing for all those cases in which the authors of the *Report* state 'average' wages of the individual." I think this must be interpreted to mean that those cases in which the *Report* does *not* state them are ignored.

[8] But this did not prevent Professor Pearson from stating in *The Times* (July 12, 1910) the direct contrary: "Where there was a difference between the trade-wages of fathers and the average wages actually received, the latter were used and not the former." It was clear, of course, as Professor Marshall pointed out, that this statement must be incorrect, for in numerous cases the *Report* gives no *data* from which the average wages actually received could be computed.

[9] I have stated these two, because a *primâ facie* discrepancy led me to look into them. I have not examined any others in detail, except those which I refer to later.

10*s.* to 12*s.* irregularly, and the earnings of the third were unrecorded. The case of the nine railway porters is even more extreme. There was only one railway porter whose average wage was known; his wages were 18*s.* In the wage summary of the original report this was given, through a misprint presumably, as 28*s.*, but it is explicitly stated to be based on one case only. Professor Pearson copies the misprint, and then applies the wage based on this single instance to eight other individuals, all but one of whom were not railway porters at all, but were, perhaps, connected with the railway in some other capacity. Professor Pearson regards the misprinted wage of a single porter to be a satisfactory index to the wages of everyone who may be connected with a railway company in any capacity.

But even if these supposed averages were true averages, they would not be very relevant to the matter in hand. For they do not attempt to discriminate between the drinkers and non-drinkers, and cannot help us, therefore, to determine the relative earnings of these two classes. Professor Pearson has classified the men into their trades, whether they were helpless invalids, lunatics, in regular or in casual employment, and has then put against them the wages they *might* have earned, not those which they actually do earn. Having thus assumed from the beginning his own solution of the point at issue, namely, as to whether the drunkards in a trade earn as well and as regularly as the sober in that trade, he arrived not unnaturally at the conclusions quoted above. The following analysis of two trades makes this plain.

Let us take blacksmiths. The actual details in the report are as follows:—

Number in list.	Wage.	Comment.
35	20*s.*..	Father drinks his earnings.
147	30*s.* when in full work.... + 10*s.* as caretaker of club	Work usually slack in winter. Is a teetotaller now, but till his wife's death was a hard drinker, and broke her heart.
212	35*s.* regular, fifty-one weeks	Well-to-do, industrious, sober.
247	34*s.* when in full work .... 20*s.* three months of year	Nervous, excitable and deaf, and not quite steady in habits.
432	26*s.* 9*d.* regular	Both parents drink.
770	On own account, wages unknown, contributes 15*s.* to family income	Father drinks all that he himself makes.

This appears in Professor Pearson's table as—

38*s.* 10*d.*,[10] 1 Sober, 5 Drunken.

No. 147, who is now a teetotaller, evidently counts as drunken; also No. 247, who is not quite steady. If we count Nos. 147 and 212 as sober, No. 247 as doubtful, and omit No. 770, whose wages are unknown, the average earnings are as follows :—

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[10] This is evidently a mistake for 28*s.* 10*d.*, which is the average wage quoted in the Edinburgh *Report*.

2 sober at 37*s.* 6*d.* | 1 doubtful at 30*s.* 6*d.* | 2 drunken at 23*s.* 6*d.*[11]

Or take bookbinders : the details are as follows :—

Number.		
135	33*s.* full 31*s.* 3*d.* average	Father delicate.
142	32*s.* full 26*s.* 6*d.* average	Father drinks, and is queer-tempered.
227	Nil	Family teetotal for the present, but the father's health has been ruined by over-indulgence, so that he has now locomotor ataxia, incurable.
419	35*s.* full 31*s.* average	Quite satisfactory.
425	24*s.* regular	Decent family on the whole.
546	32*s.* casual	An unsteady bookbinder; sprees.
688	27*s.* casual	Father with consumption which keeps him from doing regular work ; drinks.
689	32*s.* regular	Very unsatisfactory at work ; thought to drink.
732	32*s.* regular	Parents both drink ; man used to be very bad, but the threatening of dismissal from work seems to have sobered him, and he is not as bad as he was.

This appears in Professor Pearson's table as—

30*s.* 3*d.*, 3 Sober, 5 Drunken.

It seems almost impossible to summarise the actual facts, even approximately. If we reckon Nos. 546 and 689 as doubtful drinkers, and reduce the full wages of Nos. 546 and 688, who are casual, by one quarter, we have—

3 sober at 28*s.* 9*d.* | 2 doubtful at 28*s.* | 4 drunken at 20*s.*

It is to be noticed that Professor Pearson does not hesitate to reckon No. 227, who has done no work for seven years, as though he earned normal wages.

These tables are in no way selected. I have made no others. I endeavoured to analyse the wages of the bakers, but could find only 17 fathers of families in the trade, as compared with Professor Pearson's 21, possibly due to his including confectioners or some other allied trade. It seemed probable, however, that he had reckoned a man in an asylum with *delirium tremens* as earning full wages. I noticed also that the drunken tram-driver whom he reckons at 27*s.* was in prison, and that the drunken clerk whom he reckons also at 27*s.* was out of work and supported by his wife's brothel. It was evidently needless to make any further inquiries into the manner in which this table had been compiled. It is difficult to know how properly to characterise the work of a statistician who uses in controversy a table of this description with complete dogmatic assurance and without making plain to the reader the principles of its construction. Dr. Marshall's comment upon it, that it had no bearing on any question in which he was interested, seems to have been well justified.

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[11] I do not claim that this is a satisfactory summary ; but, if one is to make a summary at all, this seems the best possible.

The methods of "the trained anthropometrical statistician" need applying with much more care and caution than is here exhibited before they are suited to the complex phenomena with which economists have to deal. The unavoidable vagueness and want of precision in the *data*—of the wage statistics, in this case, of a miscellaneous group of workers—often render impossible an exact classification into numerical tables. Professor Pearson may cover up by elaboration of method, but he cannot hope to mend by it the gaps, beyond repair, in his original materials.

I am, your obedient servant,

J. M. KEYNES.

King's College, Cambridge.

CURRENT NOTES.

The trade returns continue to show the progress already recorded this year, the imports and exports for November, as for the twelve months past, showing increased values. The subjoined tables compare the returns of the twelve months ending November, 1910, with the twelve months ending November, 1909 :—

[000's omitted.]

Exports.	Twelve months ending November, 1910.	Twelve months ending November, 1909.	Increase (+) or Decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	25,977,	23,288,	+ 2,689,
II. Raw materials and articles mainly unmanufactured	53,371,	50,895,	+ 2,476,
III. Articles wholly or mainly manufactured	339,643,	293 061,	+ 46,582,
IV. Miscellaneous and unclassified (including parcel post)	7,965,	6,718,	+ 1,217,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	12,770,	11,900,	+ 870,
II. Raw materials and articles mainly unmanufactured	63,212,	53,203,	+ 10,030,
III. Articles wholly or mainly manufactured	27,284,	24,540,	+ 2,744,
IV. Miscellaneous and unclassified (including parcel post)	238,	275,	− 37,
Total, British, foreign and colonial	530,490,	463,910,	+ 66,580,
Exports of bullion and specie	64,749,	60,910,	+ 3,839,

[000's omitted]

Imports.	Twelve months ending November, 1910.	Twelve months ending November, 1909.	Increase (+).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	257,905,	252,563,	+ 5,342,
II. Raw materials and articles mainly unmanufactured	253,605,	219,118,	+ 34,487,
III. Articles wholly or mainly manufactured	156,075,	146,605,	+ 9,470,
IV. Miscellaneous and unclassified (including parcel post)	2,560,	2,531,	+ 29,
Total merchandise	670,145,	620,817,	+ 49,328,
Imports of bullion and specie	73,864,	65,059,	+ 8,805,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending November, 1910.	Twelve months ending November, 1909.	Increase (+).
	Tons	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	41,392,	40,316,	+ 1,076,
Total, British and foreign, *cleared* with cargoes	57,310,	56,882,	+ 458,

Mr. Sauerbeck's index-number of prices for June, as stated in the last number of the JOURNAL, was 76·9; it recovered sharply to 78·1 in July, mainly owing to the renewed advance in corn; was maintained at 78·2 in August; fell off again to 77·6 and 77·2 in September and October, owing to the falling prices of food, and recovered slightly in November to 77·8. Taking food and material separately, the course has been as follows:—

	June.	July.	August.	September.	October.	November.
Food	74·5	76·6	74·9	72·2	70·2	70·7
Materials	78·6	79·2	80·5	81·5	82·4	83·0

Mr. Sauerbeck estimates that the average for the year will be as nearly as possible 78, against 74 in 1909, 73 in 1908, and 80 in 1907. The *Economist* index-number shows a continuous rise since June, the figures being: June, 2,368; July, 2,386; August, 2,407; September, 2,418; October, 2,453; November, 2,461.

According to the Board of Trade *Labour Gazette*, the state of the labour market since last May has been as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
June, 1910	416	702,522	25,866	3·7
May, 1910	416	703,439	29,787	4·2
June, 1909	416	698,284	55,331	7·9
July, 1910	416	698,888	26,664	3·8
June, 1910	416	702,522	25,866	3·7
July, 1909	416	693,848	54,877	7·9
August, 1910	416	705,473	28,406	4·0
July, 1910	416	698,888	26,664	3·8
August, 1909	416	697,268	53,918	7·7
September, 1910	416	674,760	28,703	4·3
August, 1910	416	705,473	28,406	4·0
September, 1909	416	695,720	51,749	7·4
October, 1910	416	678,379	30,088	4·4
September, 1910	416	674,760	28,703	4·3
October, 1909	416	694,930	49,664	7·1

As compared with a year ago, most of the principal industries showed an improvement during this period.

The meeting of the British Association was held at Sheffield from August 31 to September 7, under the Presidency of the Rev. Professor Bonney. Sir H. Llewellyn Smith was President of Section F (Economic Science and Statistics), and opened his address with a survey of recent tendencies in economics, noting the increasingly technical character of the phraseology and methods employed in economic literature and the increasing importance attached to quantitative measurement with the aid of the "separate "though auxiliary science of statistics." The resulting demand for more and better statistics, it was pointed out, does not always pay due regard to what is practicable, nor to the limitations necessarily introduced by the fact that large masses of periodical returns are unavoidably based on "common" statistics—*i.e.*, statistics not designed nor compiled specially for one particular purpose, but destined to serve several purposes in common. Attention was then directed to the growing emphasis laid on ends as distinguished from means as the object of economic study, and it was suggested that economists should now accept "fully and frankly" the task of distinguishing between noble and ignoble ends of economic conduct, and should regard all their methods of research as only means to this end. As an example, the President proceeded to consider the question of economic security, and more particularly the question of assurance against unemployment. For his most interesting discussion of this question we must refer to the original: space will only permit us to indicate the conclusions that any practicable scheme must be compulsory and contributory; that there must be a *maximum* limit to the amount of benefit which can be drawn, and that the rate of benefit must be relatively low; that both employers and workmen must be interested in contributions and management; that the scheme must be based upon the trade group, and should at the outset be partial in operation, but the group must be a large one; that the scheme must aim at encouraging the regular employer and workman and discriminating against casual engagements; and, finally, that a State subvention and guarantee will be necessary, and a certain amount of State control, but voluntary provision must not be discouraged. "Is such a scheme practicable?" the President asked at the conclusion of his address, and answered the question with a qualified affirmative:—"So far as can be judged from such "data as exist . . . a scheme framed on the lines that I have "indicated is actuarially possible at least for such a group of trades "as building, engineering and shipbuilding—that is to say, a "reasonable scale of contributions will yield benefits substantial in "amount and of sufficient duration to cover the bulk of the unemployment ordinarily met with in these trades."

Mr. J. St. G. Heath read a note on "Under-employment and the "mobility of labour," illustrated by tables based on the census data for 1891 and 1901. In certain industries, chiefly the "unwalled," *i.e.*, unskilled or slightly skilled trades for which little or no preliminary training is necessary, many men between the ages of 25 and 35 appear to have entered the industry; in others men over 25 appear to have been displaced, or replaced by women. A further paper on "The trade cycle and solar activity," outlining the relation between periodic variations in the weather and the crops, and the effect of abundant harvests on trade in general was contributed by Professor Jevons; an examination of the statistics of crises since 1696 suggests that the period of the trade cycle is a multiple of 3·4 years. Mr. H. Verney dealt with "Statistics of cotton mill "accidents," re-emphasising several of the points that were brought out by his paper on factory accidents in general, read before this Society last February.

The figures given by Mr. G. H. Wood in his note on the "History of Sheffield wages" seem of sufficient interest to cite in full. The following are the index-numbers (1883 = 100):—

	Puddlers.	Coal hewers.	Building.	Furnishing.	Printing.	Engineering.	Weighted average.
Weights ...	1	1	4	1	1	3	11
1835.......	—	—	—	—	84	—	—
Circa—							
1840....	87	67	—	—	94	—	78
'50....	93	67	76	—	94	—	78
'55....	125	86	83	—	94	73	86
'60 ...	100	82	83	—	94	73	82
'66....	118	92	93	83	94	84	92
'71 ..	110	89	93	86	94	85	92
'74 ...	145	134	101	97	100	94	106
'77....	103	96	108	103	100	97	102
'80....	107	91	103	100	100	91	98
'83....	*100*	*100*	*100*	*100*	*100*	*100*	*100*
'86....	96	91	101	100	100	100	99
'91....	100	127	105	106	107	101	106
'96....	91	118	109	106	107	102	106
1900....	128	133	116	103	107	107	114
'06....	113	118	116	107	114	108	113

Comparisons were made of the course of wages in the trades in Sheffield with the course of the same trades in the United Kingdom, and of the "weighted average" compared with the course of wages in the chief industries of the country taken together, the latter comparison being as follows:—

	1850.	1855.	1860.	1861.	1871.	1874.	1877.	1880.	1883.	1886.	1891.	1895.	1900.	1906.
United Kingdom	56	65	64	74	77	87	85	82	84	83	91	91	100	101
Sheffield	68	75	72	81	81	93	89	86	88	87	93	93	100	99

The course of wages in Sheffield as indicated by the trades considered is very similar to the course of wages in the United Kingdom, but wages in Sheffield have not advanced by so great a percentage in half a century. There are a large number of trades mainly located in Sheffield, but for none of these is the information self-consistent. The records for the file and saw trades were examined as examples, and the writer urged that, as the evidence points to the course of wages in these trades having differed so greatly from that of wages in the great industries of the country, an investigation specially directed to filling the gaps in the information and solving the difficulties should be undertaken.

In a note on "The measurement of profit" Professor W. J. Ashley gave an account of the various attempts of Continental statisticians, from Körösi onwards, to define *Gewinn* (gain or profit) from the two points of view of the companies and of the shareholders respectively and to disentangle the pertinent figures from the company balance-sheets; the problem is a difficult one, and questions of statistical method are bound up with questions of economic principle. The remaining papers read before the section appear to have been mainly of a non-statistical character, with the exception of the important contribution of Mr. A D. Hall and Mr. E. J. Russell on "The error of experiment in agricultural "field trials," which was read at a meeting held in joint session with the Agricultural Subsection. The report of the committee on the distribution of small incomes, below the income-tax exemption limit, is reprinted in full at page 37. Reference may be made to the discussion on tests of intelligence in school children, which was held at a joint meeting of the Anthropological and Educational Sections, as it deals with a point of great importance in connection with school surveys.

The annual report issued by the Home Office on "Statistics of "Compensation and of Proceedings under the Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, "during the Year 1909" [Cd-5386, price 7*d.*], renders available for the first time substantially complete returns from the seven great groups of industries—mines, quarries, railways, factories, harbours and docks, constructional works, and shipping. These returns furnish materials for a general review of the working of the Compensation Act in 1906 in relation to the main bodies of the industries of the United Kingdom. In these seven groups of industries the number of employers included in the returns was 117,391, and the average number of persons employed coming within the provisions of the Act was over 6½ millions, of whom over 4½ millions come under the heading "factories." In these industries, in the year 1909, compensation was paid in 3,341 cases of death and in 332,612 cases of disablement. The average payment in case of death was 154*l.*, in case of disablement 5*l.* 6*s.* The annual charge for compensation, taking the seven groups of industries together, averaged 6*s.* 10*d.* per person employed. It was lowest in the case of persons employed in factories, being only 3*s.* 5*d.* per person; in the case of railways it was 7*s.* 1*d.*; it rose to 9*s.* 2*d.* in quarries, to 10*s.* 8*d.* in shipping, and to 14*s.* 11*d.* in constructional works; it was highest in docks, 16*s.* 8*d.*, and in mines, 20*s.* 1*d.* The total amount of compensation paid under the Act in the seven groups of industries during the year was 2,274,238*l.* Allowing for the industries which are not included in these returns, the total amount of compensation paid in all industries, it is estimated, can hardly fall short of 3,000,000*l.*

In a lecture recently delivered before the "Konferenz zur Förderung der Arbeiterinnen-Interessen,"[1] some figures were given from the German Census of 1907, showing the remarkable increase of women's employment in the German Empire. The numbers of women occupied were in round numbers as follows:—

	1882.	1895.	1907.
Women occupied	4,259,000	5,264,000	8,243,000
Per cent. of female population	18·5	19·3	26·4

Thus in twenty-five years the numbers had nearly doubled. In the same period the percentage of males occupied increased 0·9 per cent.

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[1] *Der Anteil der Frau an der deutschen Industrie.* By Helene Simon. Jena: Fischer, 1910.

Even more remarkable is the increase in the proportion of married women occupied. Their numbers rose from 1,046,000 in 1895 to 2,809,000 in 1907; and the proportion of occupied women who were married increased 14 per cent. in the same period, and, between 1882 and 1907, rose from 16 per cent. to 34 per cent., being more than doubled in the quarter-century. Including widows and divorced women with the married, it appears that nearly half the women in occupations are or have been married. Of the 8,200,000 occupied women, over one half are engaged in agriculture and allied occupations (*Landwirthschaft*), which shows an increase in numbers of women occupied amounting to 67 per cent. since 1895. The employment of women in trade and transport (*Handel und Verkehr*, which includes hotel and innkeeping) increased 60·7. Domestic service alone among female occupations shows a decrease in numbers, thus:—

	1882.	1895.	1907.
Domestic servants	1,282,414	1,313,957	1,249,383

The higher callings or professions for women have more than doubled their numbers since 1882, but they are, of course, relatively inconsiderable; their numbers amounted in 1907 to 288,311. While the number of women engaged in industry has increased from 1,521,118 in 1895 to 2,103,924 in 1907 (or 38 per cent.), this increase is far behind the increase of the number engaged in agriculture. The increase of women in rural pursuits does not, however, indicate that agriculture is gaining on industry, but appears to result from the necessity of supplying the many places left empty through the emigration of men to industrial centres. Madame Simon points out that the abandonment of agriculture by men (*Landarbeiterflucht*) is analogous with the tendency of women to abandon urban domestic service (*Dienstbotenflucht*). In the country man seeks his liberty. In the towns, whether for good or for evil, woman does the same. In both cases manufacturing industry profits. The country labourer and the servant girl alike fly to the factory. Taking both sexes together, industry shows a very large relative increase, viz., 52 per cent. in persons occupied (*Erwerbthätige*) and 76 per cent. in industry from 1882 to 1907.

The Bureau of Statistics of the U.S.A. Department of Agriculture has published a bulletin entitled "Agricultural Graphics" containing 88 charts, 62 of the United States and 26 of the world. They show the average annual production of the principal crops and the average number of live stock in the United States for the two decades 1899-1908 and 1869-78 by means of proportionate circles in each State. For the world a comparison of different periods is not attempted, but the figures for the latest available year —not necessarily the same year for each country—are adopted. The charts are on too small a scale to give more than a very general impression of the statistics represented, and for readers desiring a more precise knowledge of the facts it would have been convenient if the actual figures had been added as an appendix. But the publication, which is evidently designed for the use of farmers to whom tabular statements would not appeal, is a significant and praiseworthy attempt to disseminate statistical knowledge by the graphic method.

A supplement to the fifth number of *La Riforma Sociale* for the current year presents a study of price movements in Italy during the period 1881-1909 by Dr. Necco. More than one method of combining the details has been tried, the method which is finally selected being that employed by M. de Foville in his calculations of the movements of prices of French imports and exports, and, following this example, separate index numbers are calculated for imports and exports; the year 1881 being taken as the starting point and reference date. The import index shows movements closely parallel to those shown by Mr. Sauerbeck's index number, and by the index of M. de Foville for imports into France; the rise of the Italian number in 1907 being, however, markedly less than that of the Sauerbeck number. The import index would appear to relate to what may be called "in bond" values, and some interest attaches to the comparison of its movements with those of the export index, which has been somewhat lower than the import index in every year since 1887, with the exception of 1894 and 1895, and the rise of which in 1899 and 1900 was very notably less than that of the import index. The general similarity of the fluctuations of average prices in England and France and at Hamburg and Italian ports, as measured by index numbers based on prices for groups of commodities showing considerable variety, is a striking feature brought out by Dr. Necco. The average values, to the nearest whole number, of various index numbers cited were as follows in the successive quinquennia for which data are available :—

	1881-85.	1886-90.	1891-95.	1896-1900.	1901-05.	1906-09.
Necco—						
Italian imports	92	82	75	76	79	86
„ exports	92	81	75	71	75	80
De Foville—						
French imports	93	84	76	75	78	—
„ exports	96	90	87	84	86	—
La Réforme Economique—						
French prices....................	—	—	93	90	95	105
Annuaire Statistique—						
Prices at Hamburg	119	107	102	98	106 {	114 1906-08
Mr. Sauerbeck—						
English prices	80	70	67	66	70	76

The report and memoranda of the Royal Commission on the Church of England and other religious bodies in Wales and Monmouthshire has now been issued [Cd-5432, price 3*s.* 3*d.*]. In the course of an account of Church endowment the report gives data showing that the Welsh dioceses have received sums amounting to 4,306,338*l.* from private sources since 1840. The total is made up thus :—Church buildings, restoration, and furnishing, 3,332,385*l.* ; churchyards, 83,218*l.* ; parsonages, 575,554*l.* ; parish rooms, 169,497*l.* ; and restoration and repair of diocesan buildings, 145,684*l.* The voluntary contributions from Easter, 1905, to Easter, 1906, came to 298,982*l.* The gross income from endowments, including those for particular purposes, is 245,134*l.* Of the 59,366*l.* received in 1906 by the Welsh Church through the Ecclesiastical Commissioners Wales only contributed 35,759*l.* The methods of obtaining Church of England and Nonconformist statistics cannot be identical, owing to the different ways in which such terms as "members" and "communicants" are used ; and the figure given for "adherents" can only serve the purpose of an estimate. At the same time, totals are given which show that, excluding the Roman Catholics, there are two communicants, or fully admitted members of some denomination, in every five persons in Wales over three years of age—743,361 out of 1,864,696, made up of 193,081 Churchmen and 550,280 Nonconformists, the latter being subdivided into 143,835 Baptists, 170,617 Calvinistic Methodists, 175,147 Congregationalists, 40,811 Wesleyan Methodists, and 19,870 belonging to smaller denominations. The members of the Church of England and Nonconformist Sunday schools are reported as numbering 168,786 and 611,083 respectively, to which are added 13,457 and 56,479 teachers. The seating accommodation available, including the figures for Roman Catholic churches, exceeded the total population of the last census by 6,234. The Commissioners explain that Nonconformists consider it their duty to provide accommodation for special services and festivals, when the attendance is unusually large. Another reason mentioned is the making of provision for future increases in the congregation.

The memoir by Professor Karl Pearson and Miss Elderton on the influence of parental alcoholism, which was reviewed by Mr. J. M. Keynes in the July number of the JOURNAL, has evoked considerable discussion in the daily press and elsewhere. Among others, certain letters appeared in *The Times* during August last from the pen of Professor Marshall, criticising the methods and conclusions of the memoir on grounds which were in great part identical with those taken by our reviewer. In reply, Professor Pearson issued through Messrs. Dulau and Co. a pamphlet entitled *Questions of the day and of the fray. No. 1. Supplement to the memoir entitled "The influence of parental alcoholism on the physique and ability "of the offspring, a reply to the Cambridge economists."* Some comments on this pamphlet will be found in a letter from Mr. Keynes in the present number of the JOURNAL (p. 114).

The fourth and fifth parts of the Preliminary Tables of the Census of Production have now been issued. The tables given in Part IV cover the production of iron mines and iron quarries, mines other than coal and iron, copper and brass factories and workshops and all the more important branches of the finished metal trades, with the exception of gold and silver plate, needles, pins, and a few minor articles of metal. Other industries dealt with include small arms, railway carriage and wagon-building, scientific instruments, &c., explosives, and manufactured fuel factories. Information is also given respecting productive work carried on by railway companies and in the Royal Ordnance Factories. The gross output (selling value or value of work done) for private factories and workshops is 147,935,000*l.*, for railways 34,703,000*l.*, and for Royal Ordnance Factories 3,359,810*l.*, the output for private factories and workshops being calculated on a profit basis, while that for railways and Royal Ordnance Factories is calculated on the cost of production. The cost of materials used is 111,725,000*l.*, 17,600,000*l.*, and 1,908,151*l.* respectively, while the amount paid to other firms by the various factories for work given out is 533,000*l.* The net output, *i.e.*, the excess of the gross output over the cost of the materials used and the work given out is 35,677,000*l.* for private factories and workshops, 17,103,000*l.* for railways, and 1,451,659*l.* for Royal Ordnance Factories. The total of employed (except out-workers) is 359,479 for private factories and workshops, 241,526 for railways, and 14,533 for Royal Ordnance Factories.

Part V of the Preliminary Tables is mainly devoted to the food, drink, and tobacco trades. It covers the output of all classes of factories and workshops engaged in these trades, with the exception of those engaged in the manufacture of preserved meats, sauces, and pickles, and in fish-curing, bacon-curing, and butter and cheese-making. A certain amount of manufacture carried out by retail establishments and (in the case of cider making) by farmers is, however, not covered by the Census. Information is given respecting productive work carried on in Army Bakeries and Naval Victualling Yards in the United Kingdom. The gross output for private factories and workshops is 257,215,000*l.*, for Army Bakeries 61,925*l.*, and for Naval Victualling Yards 34,971*l.*, the two last figures being obtained on the basis of cost of production, not on a profit basis, as in the case of the private factories. The cost of materials used is 172,692,000*l.*, 55,468*l.*, and 32,487*l.*, respectively, and the amount paid for work given out is 198,000*l.* The net output is 84,325,000*l.* in the case of private factories, 6,457*l.* for Army Bakeries, and 2,484*l.* for Naval Victualling Yards, and the total of persons employed is 407,830 for private factories, 136 for Army Bakeries, and 28 for Naval Victualling Yards. In several cases in the Tables the particulars relate to the manufacture of dutiable articles or articles containing dutiable ingredients. Except in the case of spirit-distilling factories (where the returns related to the value of the spirits in bond), the value of the products wholly or in part dutiable as returned by manufacturers represents the price charged to the purchaser, and thus includes the duty in respect of that portion sold for home consumption. Where dutiable goods or goods containing dutiable ingredients are sold for export, either out of bond or with the benefit of drawback, their value, being based on the price charged to the foreign or Colonial purchaser, naturally does not include duty.

The "Commissioners of Customs and Excise," who, under the Finance Act, 1908, continue the work of the Commissioners of Customs, have now issued their first report (Cd–5302. Price 9*d.*) By Order in Council the management of the duties of Excise and of the powers and duties of the Commissioners of Inland Revenue in connection therewith were transferred on April 1, 1909, to the Commissioners of Customs and Excise, and the present report is the fifty-fourth relating to the Customs and the fifty-third relating to the Excise. The dissolution of Parliament without the passing of a Bill to give effect to the Resolutions of the House of Commons placed the Commissioners in a quite exceptional position, and caused them to offer to accept payments equivalent to the duties to which the resolutions related as deposits. This offer, it is stated, was regarded generally by traders as one most favourable to their interests, with the result that during the period between December 3, 1909, and April 20, 1910, when resolutions were passed in the House of Commons imposing, as from the dates mentioned in the Budget Resolutions of 1909, the duties specified in those resolutions, the sums collected as duty and the sums paid as deposit or withheld under the notice were as follows:—

		Amount collected as duty.	Amount paid as voluntary deposits.	Amount withheld and outstanding on April 20, 1910.		
		£	£	£	*s.*	*d.*
Tobacco	Customs	5,525,359	1,068,652	140,005	2	6
Tea	,, ...	—	2,229,651	1,038	4	5
Beer	,, ...	6,901	215	—		
Spirits	Customs and Excise	6,094,953	1,708,530	348,691	14	5
Motor spirit	,, ,,	—	152,918	—		
Total		11,627,213	5,159,966	489,738	1	4

Upon the passing of the Act the several sums making up the amounts above referred to as having been withheld and outstanding were claimed, and the whole of them were paid—the last item being received on June 27, 1910.

In August, 1909, the Government of India addressed the several local Governments and Administrations on the subject of a proposal by the Sanitary Commissioner with the Government of India that a permanent organization should be formed to enquire systematically into problems, both practical and scientific, connected with malaria in India. A conference of administrative and medical officers and others was held in October of the same year, and as a result a Central Scientific Committee was formed, on lines which were approved by the Government of India, especially in regard to the importance of carrying out the statistical enquiries recommended by the conference. The transactions of the committee, which are entitled *Paludism*, and are edited by its Secretary, Major S. P. James, M.D., I.M.S., are being issued, under the authority of the Sanitary Commissioner. The first number contains a memorandum by Captain S. R. Christophers, I.M.S., on "Suggestions on the use of available statistics for studying malaria in India."

A memorandum has been issued by the Government of Tasmania entitled "Considerations regarding the Federation of States which "differ materially, at the initial stage, in the magnitude of population or development," by Mr. Robert M. Johnson, I.S.O., Government Statistician and a Fellow of this Society. The writer starts from the assumption that the larger the population of several federating States of the same stage of civilization the larger is the absolute cost of the government, concomitant with a smaller cost per head of population. It follows that in any true federation of States for the sake of common interests the smaller States must, even on the basis of per head of population, suffer a greater sacrifice than the greater or more advanced States. This view is borne out by the experience of the six Australian States in the year prior and subsequent to Federation, and is indicated in the following table:—

		Existing State taxes, 1908-09.			Increase, 1908-09, relative to 1899-1900.		
		Per head.		Amount.	Per cent. per head.	Per head.	
		s.	d.	£		s.	d.
1. Tasmania	1909-10	32	6	303,390	+ 153·30	+ 19	8
	'08-09	27	0	250,835	+ 110·40	+ 14	2
2. West Australia....	'08-09	22	1	296,599	+ 60·60	+ 8	4
3. South Australia............	'08-09	22	2	450,250	+ 52·89	+ 7	8
4. Queensland	'08-09	19	4	535,194	+ 26·09	+ 4	0
5. Victoria	'08-09	18	4	1,167,444	+ 22·91	+ 3	5
6. New South Wales	'08-09	11	5	907,249	− 12·18*	− 1	7*
Six States	'08-09	16	10	3,607,571	+ 5·7	+ 0	11

* Indicates a decrease.

The "inequitable character" of the distribution of the federal surplus of 1908-09 (7,927,134*l.*) to the several States is strikingly illustrated in several tables and graphs, and there is a tabular illustration showing the financial results to each State Treasury if the surplus had been allotted on such percentage values as might be obtained, for example, on the basis of the relative stress of sacrifice made by each State towards the Federal Union, as indicated by increased direct State taxes in 1909-10, on the basis of contributions by States to Commonwealth expenditure, 1908-09, on the basis of the percentage proportion of the total value of the year's industrial production of the six States, 1908-09, &c. In conclusion, it is stated that a close study of ten uniform methods, such as those indicated above, for gauging the fairness of the distribution of the federal surplus, demonstrates that no one conceivable uniform method is free from objection, but that the book-keeping method devised by the Adelaide Convention, and afterwards adopted by the Commonwealth, is "the worst of all."

The *Journal of Hygiene* issued in November a special "Plague "number." A memoir "On the spread of epidemic plague through "districts with scattered villages" is devoted mainly to the investigation of the problem whether recrudescence or importation is the more important factor in the spread of the epidemic through such a district. The first part of the memoir, due to Major Lamb, consists of an elaborate descriptive analysis, accompanied by very detailed tables, of the plague history of villages in these districts; the second part of a mathematical investigation of the data by Dr. Major Greenwood, Jr. The general lines of Dr. Greenwood's investigation are the following:—Of all the villages observed some have never been infected; some have only been infected in 1 epidemic, some in 2, some in 3, and so on. Is the actual number of recurrences in agreement with what we should expect if the fact of infection in any one epidemic were quite independent of the fact of infection in any other? If all villages, of every size, be pooled together the answer is in the negative; but if they be sorted into groups of more or less uniform size, the answer is in the affirmative. The chance of infection increases, in fact, with size of village, but for villages of about the same population the fact of previous infection does not seem to increase the probability of infection in a fresh epidemic.

Part IV of Vol. VII of *Biometrika* was issued in November last. Mr. P. F. Everitt contributes to this number a series of labour-saving tables under the title of "Tables of tetrachoric functions for four-"fold correlation tables," the purpose of the tables being to facilitate the calculation of the correlation-coefficient by Professor Pearson's method. It will be remembered that the method referred to gives for *r* an equation in which the coefficients of the successive powers are functions of the percentages of individuals classified as possessing each of the two characters correlated. Mr. Everitt's tables give the required function of each percentage, and the coefficients can be written down by simply multiplying together the two values taken from the table; for most work it will hardly be necessary even to interpolate. The only work left is consequently the solution of the equation. We have tested the tables and find a very great saving both of time and of the risk of error in a rather fidgety piece of arithmetic; roughly, we should say the time is more than halved. The calculation of such tables must have been a serious labour, and Mr. Everitt deserves the gratitude of all those who use the method in question.

A short paper of theoretical interest is that by Professor Pearson "On the constants of index distributions as deduced from the like "constants for the components of the ratio." The note has especial reference to the two memoirs, in this and an earlier issue, by Dr. Major Greenwood, Jun., and Mr. J. D. C. White on the opsonic index—memoirs which, apart from their immediate subject, are of value in regard to the theory of sampling under practical conditions. An article by Professor Pearson in the Miscellanea defends the value of teachers' returns as to the general intelligence of school children, on the basis of some data obtained from a number of teachers in Aberdeen. Professor Pearson finds a correlation, lying somewhere between 0·70 and 0·99, between the teacher's estimate of intelligence and the place of the child in an examination, when correction is made for age and standard. A second article by the same writer reviews a paper by Professor James Wilson (Scientific Proceedings of the Royal Dublin Society, May, 1910), in which apparently he concluded that there was no relation between the quantity and quality of the milk yielded by Ayrshire cattle. Professor Pearson, from the same data, finds that there is a relation, though it hardly appears so marked as to be of much practical importance; the percentage of butter fat is very slightly higher for the cows with the lower than for those with the higher yields, and it fluctuates more largely. The remaining memoirs are a mathematical study, by Mr. H. Waite, of the theoretical relation between the number of mosquitoes in a locality and the malaria rate, and a research by Mr. J. Arthur Harris into the selective elimination occurring during the development of the fruits of *Staphylea.*

A report by Dr. L. W. Darra Mair to the Local Government Board on the relative mortality in through and back-to-back houses in certain towns in the West Riding of Yorkshire [Cd–5314, price 3*d.*] was issued last August. The subject of the mortality among the inhabitants of back-to-back houses is one that has on several previous occasions engaged the attention of medical officers of health and of the Local Government Board. A useful summary of earlier investigations is given by Dr. Mair; but the data collected, with the assistance of the officers of the local authorities, for the present report cover a wider field and a longer period than has been previously the case, and great care appears to have been taken to obtain information respecting "through" and "back-to-back" houses *of the same class* in each of the areas considered. Further, the sexes and ages of the inhabitants of the houses of each type were noted, and the crude death-rates have accordingly been reduced to corrected rates on the standard population (by the method of standard death-rates). The vital statistics cover a period of ten years, 1898-1907. The corrected average annual death-rate from all causes was greater in the back-to-back houses than in the through houses by 15 per cent.; if the modern type of back-to-back houses, built in blocks of four so as to possess side ventilation, is excluded, the excess is raised to 20 per cent. The outstanding causes of death which produced this excess were (*a*) pneumonia, bronchitis and other pulmonary diseases (other than phthisis), and (*b*) diseases of defective development and of malnutrition in young children; the excess from these causes approached 40 per cent. As regards phthisis, there is an excess of 12 per cent. in the case of back-to-back houses built in rows, but no excess in the case of those built in blocks of four. We note that the rent paid for the back-to-back houses (4*s.* 6*d.*) is lower on an average than that paid for the through houses (5*s.* 6*d.*), in spite of the care taken to ensure similarity of standard. This might indicate, perhaps, some tendency for the cheaper houses to be inhabited by a lower and weaker class of population, but it seems wholly impossible that any such hypothetical influence could account for more than a very small part of the large excess of mortality from the special diseases noted above. A report on infant and child mortality, issued in July as a supplement to the report of the Medical Officer of the Board [Cd-5263, price 1*s.* 3*d.*] must be reserved for more detailed notice.

We noted in the JOURNAL for December, 1909, the publication of the first annual report of the Chief Medical Officer of the Board of Education, and had then occasion to comment on the failure of the Chief Medical Officer to carry out in his own report the spirit of the recommendation of the Board as to the inclusion of statistical matter in the reports of school medical officers. The second annual report (for 1909) of that officer has been issued [Cd-5426, price 11*d.*], and certain statistical data are now given, but they are still very sporadic in character. Of, roughly, six million children in the public elementary schools of England and Wales, about 10 per cent. suffer from serious defect in vision; from 3 to 5 per cent. from defective hearing; 1 to 3 per cent. have suppurating ears; 8 per cent. have adenoids or enlarged tonsils of sufficient degree to require surgical treatment; 20 to 40 per cent. suffer from extensive and injurious decay of the teeth; 40 per cent. have unclean heads; about 1 per cent. suffer from ringworm: 1 per cent. are affected with tuberculosis of readily recognisable form, and 0·5 to 2 per cent. are afflicted with heart disease. "Many of the reports received," says Dr. Newman, "contain valuable tables of statistics in respect "of certain findings, such, for instance, as height and weight, or the "defects of hearing and vision, which cannot be summarised, partly "because the returns are not all obtained in the same way or on the "same basis, and partly because, valuable though they are for a "given district, it would be fallacious to summarise them for all "districts." Is not the lack of uniformity in method the sole reason for which it would be fallacious to make such a summary? And is not the lack of uniformity in method, in great part at least, directly due to the failure of the Chief Medical Officer himself to provide that guidance which was so essential? "The work is not, and "and cannot be, of the nature of an anthropometric survey," says Dr. Newman. On the contrary, the work is and must be, inevitably and essentially, an anthropometric survey: the sole question is whether it shall be so carried out that the results from year to year, and from district to district, shall be comparable with one another. We still hope that the Chief Medical Officer of the Board, enthusiast as he is for the administrative side of his work, may find more time to devote to this side of the question. He holds the view, we gather from his report, that medical inspection under the local education authorities should form an integral part of the public health administration of the country; hardly any public service, we may remind him, has found statistical data of greater and more immediate utility than the service of public health.

The September issue of the *Quarterly Publications of the American Statistical Association*, in addition to two interesting articles on "International Crop-Reporting Service," by Mr. C. C. Clark, and "Railway Statistics," by Mr. Lewis H. Harvey, contains a careful study entitled "Referenda in Massachusetts and Boston," by Mr. Edward M. Hartwell. The inquiry deals chiefly with general referenda, *i.e.*, on matters relating to the constitution of the State Government, or its relation to the National Government, as apart from special referenda, relating either to the charters or charter amendments of cities, or to the acceptance of other special acts, and recurrent referenda within each city or town whereby the question of licensing the sale of intoxicants is annually determined. In attempting to measure the interest of the electorate and the significance of the votes cast upon the referenda under review, two criteria have been adopted: first, the percentage of the total vote upon a given question to the total vote cast for Governor of the State in the same year; and, secondly, the percentage of the major

Serial number.	Date.	Object of Referendum.	Vote of State of Referendum.			Vote of State for Governor.	Vote of Boston on Referendum.			Vote of Boston for Governor.	Percentages. A. Vote on Referendum to vote for Governor.			Percentages. B. Majority vote on Referendum to total vote on same.			Result in State.	In number.
			For.	Against	Total.		For.	Against	Total.		In State.	In Boston	Outside Boston	In State.	In Boston	Outside Boston		
49	1890, Nov. 4	To forbid disqualification of voters, for change of residence, within six months of such change	97,177	44,686	141,863	285,526	17,905	9,531	27,436	52,954	49·7	51·8	49·2	68·5	65·3	69·3	Article XXX	49
50	1890, Nov. 4	To relieve soldiers and sailors receiving public aid from designation of "paupers"	100,109	27,021	127,130	285,526	18,865	5,543	24,408	52,954	44·5	46·1	44·2	78·7	77·3	79·1	Article XXXI	50
51	1891, Nov. 3	To abolish payment of poll tax as a prerequisite to voting	144,931	53,554	198,485	321,650	33,490	7,170	40,660	60,995	61·7	66·7	60·6	73·0	82·4	70·6	Article XXXII	51
52	1891, Nov. 3	To make a majority of each branch of the General Court a quorum..................	152,688	29,590	182,278	321,650	33,398	4,702	38,100	60,995	56·7	62·5	55·3	83·8	87·7	82·7	Article XXXIII	52
53	1892, Nov. 8	To abolish the property qualification for office of Governor.........	141,321	68,045	209,366	399,698	29,418	13,959	43,407	74,052	52·4	58·6	51·0	67·5	67·8	67·4	Article XXXIV	53
54	1893, Nov. 7	To annul the provision for paying mileage but once to members of the General Court	125,375	80,555	205,930	365,112	24,991	20,888	45,879	71,715	56·4	64·0	54·5	60·9	54·5	62·7	Article XXXV	54
55	1894, Nov. 6	To abolish the office of Commissioners of Insolvency	114,499	31,741	119,210	335,354	23,763	8,082	31,845	66,211	41·5	18·1	43·6	76·7	71·6	77·3	Article XXXVI	55
56	1895, Nov. 5	Expediency of granting municipal suffrage to women	86,990	186,976	273,966	328,121	15,860	42,224	58,084	66,919	83·5*	86·8*	82·6*	68·2*	72·7*	67·1*	Rejected	56
57	1896, Nov. 3	To make elections of Governor. Lieutenant-Governor and Councillors biennial instead of annual	115,505	161,263	276,768	385,064	23,151	38,869	62,020	80,406	71·9*	77·1*	70·5*	58·3*	62·7*	57·0*	Rejected	57
58	1896, Nov. 3	To make elections of Senators and Representatives biennial instead of annual	105,589	156,211	261,800	385,064	21,222	38,257	59,479	80,406	68·0*	74·0*	66·4*	59·7*	64·3*	58·3*	Rejected	58
59	1907, Nov. 5	To empower the Governor to remove Justices of the Peace and Notaries Public...	178,005	35,989	213,994	373,705	40,531	9,267	49,798	83,509	58·8	59·6	58·6	83·2	81·4	83·7	Article XXXVII	59

Note.—The Referenda which became Amendments to the State Constitution are indicated under "Result in State."

* Indicates a majority against.

vote upon a given question to the total vote upon that question. The inadequacy of the data for earlier elections, however, does not permit the whole series of referenda to be satisfactorily tested by either criterion; nor is it possible to state, in respect to referenda submitted before 1890, what proportion of the registered or of the qualified voters actually voted for Governor or on a referendum in a given year. The details on previous page, extracted from a table given by the author, illustrate in an interesting manner the working of the referendum. It is proposed to follow this article with another, on "The relative interest shown by the voters of Massachusetts and "Boston in Referenda and Contests for Office, 1890-1910."

Mr. G. H. Knibbs, Commonwealth Statistician, was President of the section of Social and Statistical Science at this year's meeting of the Australasian Association for the Advancement of Science. He took as the subject of his address "The Problems "of Statistics," and, commencing with a synopsis of the history of statistics and the evolution of statistical science, passed on to a survey of the field of modern statistics, taking these under two heads—(*a*) Vital statistics, including such matters as the theory of heredity and eugenics, and (*b*) Economic statistics—statistics of production, distribution and consumption. "The science of "statistics," Mr. Knibbs writes, on turning to the present aspect of statistical problems, "is not merely resuming its original range and "dignity, but transcending that range. The wide reach of statistical method, and the demands it makes in regard to the necessary "mathematical equipment, mark it out as on the broadest planes "of human knowledge." In addition to a copy of his address, Mr. Knibbs forwards a "Note on the influence of infantile "mortality on birth-rate" (*Journ. Roy. Soc. of N.S.W.* Vol. xliv). The note forms a sequel to his previous paper on the same subject, and gives a deduction of an approximately linear relation between the initial and final birth-rate, after a change in infantile mortality, on the assumption, if we rightly follow the reasoning, that women whose children have died are more likely to produce further offspring than those whose children have survived.

The September, October, and November issues of the *Empire Review* contain an article, in three parts, by Mr. George T. Bisset-Smith (H.M. Registration Examiner), on "The Approaching "Census," dealing, respectively, with "Some observations on the "numbering of the people," "Some aspects of population," and "New features of the coming enumeration." The November issue of this review contains also a brief article on "Politics and statistics "in India," written over the pseudonym "Madrassi." The writer criticises severely the compilation of Indian statistics relating to land.

The *Yale Review* for November contains an article by Mr. Julius H. Parmelee on "The Statistical Work of the Federal Government," tracing the history of the Census Bureau of the United States through its "kaleidoscopic" career, from the first Census of 1790, when the work of the Bureau was carried on under the general direction of the President, until the establishment of a permanent Bureau in 1902. The thirteenth Census, therefore, which has just been taken, is the first to be carried out by the permanent Bureau, and its results will be awaited with more than usual interest. The writer also examines the collection of commercial statistics since their inception in 1820, and touches on the discussion during the past three years as to the advisability of consolidating the Bureau of Statistics and the Census Bureau. A special committee, appointed by the Society of Commerce and Labor in 1907, reported adversely on the question, and the Bureau of Statistics seems likely to continue its development on the present lines rather than in any new direction. At the present time the Bureau of Statistics collects and publishes statistics of foreign commerce, presenting imports and exports, respectively, by countries and customs districts, the inward and outward movement of tonnage in foreign trade, and the countries whence entered and for which cleared. The Bureau also collects and publishes information regarding the movements of internal commerce, including "coastwise" commerce and the commerce of the Great Lakes. The immigration and registry reports formerly prepared by the Bureau have been discontinued, and are now issued by the Bureau of Immigration and the Bureau of Navigation respectively.

A Committee appointed by the Council of the Eugenics Education Society has been considering "the eugenic bearing of the Majority "and Minority Reports of the Royal Commission on the Poor Law," it being held that as both reports dealt almost exclusively with administrative matters, careful investigation was required to "analyse or define the personality of the pauper, his character, "antecedents and capacities." The November issue of the *Eugenics Review* contains the report of this Committee and three other articles on poor law eugenics, viz., "Some Examples of Poor Law Eugenics," by Mr. E. J. Lidbetter (General Relieving Officer, Bethnal Green), "The Majority Report," by Dr. C. S. Loch, and "The Minority "Report," by Mr. Sidney Webb. Section III. of the Committee's report describes an "investigation into pauper family histories." The object of the investigation was to ascertain "whether pauperism "is not due to inherent civic defects; and whether therefore the "tendency to become paupers is hereditarily transmitted through "succeeding generations." The method of investigation involved the study of workhouse records and personal interviews with paupers with a view to ascertaining the full nature of the pedigree of some individual paupers. Four generations of paupers are traced, and the conclusion is stated that there can be little doubt as to the hereditary transmission of those civic defects which result in pauperism. Mr. Lidbetter makes a similar contention in his paper in submitting that "there is evidence that a high proportion of "chargeability is due to inherited defect."

An election for fourteen vacancies in the membership of the International Statistical Institute was held by correspondence during the present year and the result was announced by the President, M. Bodio, on October 26 last. The number of candidates duly nominated was twenty-four, and of these eight were elected, having received the votes of two-thirds of the members voting—being the requisite proportion necessary to secure election. The new members are Messrs. Bernard Mallet (England), E. D. Durand (United States), H. B. Greven (Netherlands), M. Sauveur (Belgium), L. Colesco (Roumania), M. Huber (France), W. Lotz (Germany) and E. H. Godfrey (Canada).

Mr. Thomas J. P. Hurst has been appointed Statistical Officer to the Port of London Authority. The Belfast University Commissioners have appointed Mr. H. O. Meredith, M.A., of King's College, Cambridge, to be Professor of Economics in Belfast University. Mr. J. M. Keynes, M.A., has been appointed Girdlers' University Lecturer in Economics in succession to Mr. Meredith.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Accountant, 1910—

September 10—The administration of local government finance in England and Wales: *Collins* (*Arthur*).

October 8—The issue of capital at a premium: *Griffiths* (*J. G.*). Recent financial legislation in some of its bearings on professional accountancy: *Barber* (*Duncan*).

November 19—Treatment of fluctuating currency in the accounts of English companies: *Cutforth* (*A. E.*).

Accountants' Magazine, 1910—

August—Can a company purchase its own shares?: *Spens* (*J. G.*).

November—The history of the income tax: *Bell* (*L. B.*).

Bankers' Magazine, 1910—

August—People's banks. National finance; the burden of expenditure. The financial and economic position of Japan. The Bank of France. The Imperial Bank of Germany.

September—Cotton bills of lading. Chinese currency reform. Is centralisation in banking conducive to the best interests of the community?: *Chisholm* (*G. D.*). The banking half-year in Canada. National Bank of Belgium.

October—Agricultural land banks. Centenary of the Commercial Bank of Scotland. Bank of the Netherlands, 1909-10.

November—Gold reserves and the fall in consols. Scheme for the creation of a national gold reserve: *Crammond* (*Edgar*). The depreciation in "Gild-edged" securities; is further "Writing down" necessary?: *Gibson* (*A. H.*). Is centralisation in banking conducive to the best interests of the community? (second prize essay).

Economic Journal. September, 1910—German labour exchanges: *Heath* (*J. St. G.*). Movement for international labour legislation: *Potter* (*Miss D. S.*). Producers' and consumers' surplus: *Pigou* (*Prof. A. C.*). Doctrine of Malthus: *Brentano* (*Prof. L.*). Applications of probabilities to economics. II: *Edgeworth* (*Prof. F. Y.*). Must inventions reduce rate of interest?: *Chapman* (*Prof. S. J.*). Depreciation: *Lyons* (*F. Oliver*). Reform of the poor laws: *Hamilton* (*C. J.*). Trade union and parliamentary representation: *Geldart* (*Prof. W. M.*).

Economic Review, 1910—

July—Land tenure and political development: *Bussell* (*Rev. Dr. F. W.*). Some impressions of German and Austrian municipal enterprise: *Glenday* (*Rev. Edward A.*). Social conditions and the principles of 1834: *Kenyon* (*Ruth*). Marginal productivity: *Hobson* (*J. A.*). Obituary; Sir Robert Giffen, K.C.B., F.R.S., LL.D.: *Price* (*L. L.*).

UNITED KINGDOM—*Contd.*

Economic Review—Contd.

October—The State as an agent for securing distributive justice: *Conacher* (*H. M.*). Labour in Japan: *Pringle* (*Rev. J. C.*). "Public assistance" and organised charities in Oxford: *Butler* (*C. Violet*). Municipal enterprise in Germany: *Tawney* (*R. H.*).

Financial Review of Reviews, 1910—

August—Taxation on savings: *Schooling* (*J. Holt*). How the Panama Canal will affect movement of the trade: *Barrett* (*Hon. John*). First principles of investment; Mr. Lowenfeld's scheme: *Crozier* (*Dr. J. Beattie*). Economic evolution of Hungary: *Szterenyi* (*His Excellency Joseph*).

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October—Foreign investments and home employment: *Hobson* (*J. A.*). The interdependence of sea power; commerce and investment: *Currey* (*Commander E. H.*).

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July—Coombe plantation, Keswick: a successful plantation at a high altitude (*continued in August issue*): *Robinson* (*R. L.*) and *Watt* (*A. Lindsay*). Water supply in relation to small holdings: *Clayton* (*Chas. H. J.*).

September—The composition of seaweed and its use as manure: *Russell* (*E. J.*).

October—Commercial cultivation of the loganberry: *Hooper* (*G. F.*). State assistance to agriculture in Denmark.

November—International forestry congress at Brussels. Co-operative live stock insurance: *Stopford* (*E. A.*).

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August—Recent developments in West Africa: *Cooper* (*J. Ashley*). Native franchise in South Africa: *Newnham* (*F. J.*).

September—The colonisation of the Caribbean: *Cundall* (*F.*). The New Hebrides: *Rason* (*Capt. E. G.*).

October—The Imperial Conference of 1911; a plea for practical results: *Drage* (*Geoffrey*). Native land tenure in South Africa. Part 1: *Newnham* (*F. J.*).

November—White colonisation of the tropics: *Lyde* (*Prof. L. W.*). The horse in Australia: *Inglis* (*G.*). Progress in Rhodesia: *M.* (*L.*).

UNITED STATES—

American Journal of Sociology, 1910—

March—Changes in census methods for the census of 1910: *Durand* (*E. Dana*). The outlook for American statistics: *Willcox* (*Walter F.*).

May—The social marking system: *Giddings* (*Franklin H.*). Notes on the recent census of religious bodies: *Coe* (*A.*).

July—A city of vagabonds: *Schelle* (*A. F. Van*). Neglected widowhood in the juvenile court: *Breckinridge* (*S. P.*). Death penalty and homicide: *Macdonald* (*A.*).

September—The housing of non-family groups of men in Chicago: *Hunt* (*Milton B.*). The opium question: *Scheltema* (*J. F.*).

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July—Contains a series of papers by different authors on: 1. The treatment of the accused and the offender. 2. Juvenile courts and the treatment of juvenile offenders. 3. The scope and limits of the injunction. 4. The administration of the criminal law; defects and proposed remedies. 5. Respect for law in the United States.

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Annals of American Academy of Political and Social Science—*Contd.*

September—Contains a series of papers by different authors on: 1. Special problems of labor disputes. 2. Methods of settlement of labor disputes. 3. The law of labor disputes in the United States. 4. The law of labor disputes abroad.

November—The problem before the National Monetary Commission: *Andrew* (*Hon. A. Piatt*). Financing our foreign trade: *Kent* (*Frederick I.*). The extension of American banking in foreign countries: *McRoberts* (*Samuel*). English methods of lending as contrasted with American: *Jacobs* (*Laurence Merton*). Utilisation of bank reserves in the United States and foreign countries: *Roberts* (*Hon. George E.*). The Canadian banking system and its operation under stress: *Johnson* (*Joseph French*). The Stock Exchange and the money market: *White* (*Horace*). The independent treasury and the banks: *Wildman* (*M. S.*). National banking system and federal bond issues: *Ailes* (*Milton E.*). Enlargement of clearing house functions: *Young* (*Stanley*). The growth of State banks and trust companies: *Barnett* (*George E.*). Branch banking among the State banks: *Eckardt* (*H. M. P.*). The operation of the mutual savings bank system in the United States, and the treatment of savings deposits: *Nichols* (*Frederic C.*). The use of credit currency by country banks: *Huston* (*J. P.*). State and national examinations of banks: *Stockwell* (*Herbert G.*). State and federal control of banks: *Frame* (*Andrew J.*).

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August—Savings bank buildings as an asset: *Kniffin* (*W. H.*).

September—Canadian banking and commerce: *Eckardt* (*H. M. P.*).

October—San Antonio, Texas, a progressive commercial centre: *Schreiner* (*George A.*).

November—The taxation question; a few thoughts, an object lesson, and some suggestions: *Bankman* (*A.*). Credit insurance: *Bazo* (*V. Gonzales*). The bicentral banking system: *Wadsworth* (*P. C.*).

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No. 88. *May*—Cost of living of families of moderate income in Germany in 1907 08. Trend of wages in Germany, 1898 to 1907. Wages and hours of labor in German woodworking industries in 1906. Wages and hours of labor in Austria, 1906 and 1907.

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Journal of Political Economy, 1910—

July—The prices of preferred and common stocks, 1890-1909: *Mitchell* (*W. C.*). The economic investigations of the United States Immigration Commission: *Lauck* (*W. J.*).

October—Shall railway profits be limited? : *Dunn* (*Samuel O.*). The income-tax in Georgia: *Shelton* (*W. A.*). Census statistics on employment of children in manufactures: *Sargent* (*F. B.*).

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AUSTRIA—

Statistische Monatschrift, 1910—

June—Die statistischen Grundlagen der Invaliden- und Altersversicherung nach der österreichischen Sozialversicherungsvorlage: *Winkler* (*Dr. Wilhelm*). Bericht über die Tätigkeit des statistischen Seminars an der Universität Wien in den Wintersemestern 1907-08, 1908-09, und 1909-10: *Meyer* (*Dr. Robert*). Die Periode 1753-1761 in der Entwicklungsgeschichte des österreichischen Volkszählungswesens: *Wittschieben* (*Dr.*).

July-August—Die Alpen im Bezirke Aflenz in Steiermark. Alpstatistische Erhebungen durchgeführt vom Statistischen Landesamte für Steiermark: *Wittschieben* (*Dr. Otto*). Studentenstiftungen im Jahre 1908: *Lorenz* (*Dr. Alfred*).

September—Die nächste Volkszählung: *Meyer* (*Dr. Robert*). Die Gesellschaften mit beschränkter Haftung: *Oberndorff* (*Karl Graf*). Die überseeische österreichische Wanderung in den Jahren 1908 und 1909 sowie die Einwanderungs- und sonstigem Verhältnisse in den wichtigsten Einwanderungsstaaten. 1. Teil: *Englisch* (*Dr. V.*).

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July—Les grandes compagnies de commerce sous le règne de Louis XIV: *Levasseur* (*Émile*). Le souverain anglais: *Caudel* (*Maurice*). La taxation des bénéfices industriels et commerciaux et l'impôt sur le revenu en Espagne: *Valette* (*Baudin de la*). Le port de Barcelone: *Dewarrin* (*Maurice*). Chronique financière: *Henry* (*P.*).

September—Albert Vandal: *Leroy Beaulieu* (*A.*). Les colonies sous le règne de Louis XIV: *Levasseur* (*Émile*). Le rôle du Port de Paris dans l'économie de la capitale: *Maury* (*François*). La réforme électorale en Prusse: *Matter* (*Paul*). La politique douanière de l'Empire allemand. I.—Le prince de Hohenlohe-Schillingsfürst; la préparation du tarif douanier: *Armagnac* (*J.*) et *Saint Girons* (*P.*). Le rachat des chemins de fer au Japon: *Lévy* (*Maurice*).

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Bulletin de Statistique, Ministère des Finances, 1910—

June—Enquête sur la circulation monétaire et fiduciaire.

July—Le projet de budget pour l'exercice 1911. Production et consommation des alcools en 1909 et 1908.

August—Loi portant revision du tarif général des douanes.

September—Loi portant revision du tarif général des douanes. (Suite et fin.) Les contributions directes et les taxes assimilées. Les octrois en 1909.

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July—La revanche des vérités économiques: *Guyot* (*Yves*). Le café au Brésil: *d'Anthouard* (*A.*). Les limites du droit de grève: *Feely* (*Joseph J.*). L'erreur protectionniste: *Pupin* (*René*). Le Mexique et ses finances: *Guyot* (*Yves*). Les assurances agricoles au Conseil d'État en 1858. Lettre de M. Léon Cornudet à M. Frédéric Passy: *Cornudet* (*Léon*). Les journées de maladie à la Société du gaz de Paris: *Macler* (*Ch.*).

August—Le problème de la dépopulation: *Molinari* (*G. de*). Les Mines.—Charges et menaces fiscales: *Guyot* (*Yves*). Le recensement hongrois à effecteur à la fin de l'année 1910: *Vizaknaï* (*Antoine*). La situation économique du Portugal: *Marvaud* (*Angel*). Les travaux parlementaires de la Chambre des deputés (1909-10), fin de législature: *Liesse* (*André*). Mouvement agricole: *Molinari* (*Maurice de*).

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October—L'accaparement: *Molinari* (*G. de*). L'État et l'épargne: *Guyot* (*Yves*). Les deux régimes: *Lambert* (*Henri*). La réforme de la loi de 1844 sur les brevets d'invention: *Jacq* (*Fernand*).

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Journal de la Société de Statistique de Paris, 1910—

August-September—Statistique des successions en France et à l'étranger: *Bertillon* (*Dr. Jacques*). Chronique de démographie: *Huber* (*M.*).

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October—L'accroissement de la circulation à Londres et à Paris: *Cadoux* (*Gaston*). Note complémentaire sur la statistique des successions en France et à l'étranger: *Bertillon* (*Dr. Jacques*). L'Algérie agricole; population et production: *Meuriot* (*Paul*).

November—La Banque de France de 1897 à 1909: *Théry* (*Edmond*).

La Réforme Sociale, 1910—

July 1—16—La notion des classes moyennes: *Rivière* (*Louis*). Le petit commerce et la petite industrie: *Aynard* (*E.*). Du rôle social des classes moyennes: *Colrat* (*Maurice*). L'impôt sur le revenu et les classes moyennes: *Roche* (*Jules*).

August 1—16—Les utilités du crédit populaire pour les classes moyennes: *Rayneri* (*Charles*). Etablissements de crédit et banques locales: *Maroussem* (*Pierre du*). Les retraites des employés de chemins de fer: *Doin* (*Paul*). L'organisation corporative des classes moyennes: *Saint-Léon* (*Et. Martin*). L'organisation corporative des classes moyennes en Belgique: *Schoonheydt* (*Jules*). Enquête sur la situation des classes moyennes. Toulouse et la Haute-Garonne: *Boyer-Montégut* (*Robert de*).

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October 1—Les charges fiscales du petit commerce et de la petite industrie: *Hubert-Valleroux* (*M.*). Les chambres de métier en Allemagne: *Purpus* (*Dr. H.*). Les procédés d'exploitation du grand commerce et leur application au petit commerce (dernier article): *Lambrechts* (*H.*).

October 16—Les sociétés co-opératives de consommation et les commerçants: *Gide* (*Charles*). Les pupilles de la Société d'économie sociale en Tunisie, rapport sur la fondation Commines de Marsilly: *Joly* (*Henri*). Le petit commerce, la petite industrie et la question de l'apprentissage: *Ribes* (*Auguste Champetier de*). Une statistique des accidents du travail dans une entreprise privée: *Hans* (*P.*). L'organisation des classes moyennes en Autriche: *Dufourmantelle* (*M.*). Le placement et le chômage: *Olphe-Gaillard* (*M.*).

November 1—Du rôle de l'État à l'égard des classes moyennes: *Truchy* (*M.*). Le petit crédit bergamasque et sa fonction dans l'agriculture et dans l'industrie: *Rezzara* (*Nicolo*). L'Allemagne à l'exposition de Bruxelles: *Polet* (*Georges*). Le placement et le chômage: *Olphe-Galliard* (*M.*).

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Revue d'Économie Politique. 1910—

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October—La monnaie en France au xvii^e et au xviii^e siècles: *Levasseur* (*E.*). La méthode de Proudhon dans ses premiers mémoires sur la propriété: *Bouglé* (*C.*). Le socialisme municipal en France: *Nézard* (*H.*). Une théorie négligée (deuxième article): *Landry* (*A.*).

GERMANY—

Archiv für Rassen- und Gesellschafts-Biologie. 1910—

May-June—Theoretische Beiträge zum Darwinismus: *Becher* (*Dr. Erich*). Kasuistische Beiträge zur gleichgeschlechtlichen Vererbung: *Brandenberg* (*Dr. Fritz*). Über die Verbreitung der Lues, speziell in Berlin und ihre Bedeutung als Faktor des Rassentodes: *Lenz* (*Fritz*). Zur Entwicklungsgeschichte der indogermanischen Rasse. Ein rassengeschichtlicher Versuch: *Reibmayr* (*Dr. Albert*).

July-August—Variabilitäts-Studien: *Römer* (*Dr. Theodor*). Die Bedeutung der Vererbung für Krankheits-Entstehung und Rassenerhaltung (Tier- und Menschenzüchtung): *Martius* (*Dr.*).

Deutsches Statistisches Zentralblatt, 1910—

July—Die österreichische Konferenz für Städtestatistik: *Klezl* (*Dr. F. Freiherr*). Die italienische Städte-Statistiker-Vereinigung: *Giusti* (*Prof. Ugo*).

August—Die statistische Tätigkeit des Internationalen Landwirtschaftsinstituts: *Wieth-Knudsen* (*K. A.*).

Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft (*Schmoller's*). *Heft* 3, 1910—Die neuere Wirtschaftstheorie in den Vereinigten Staaten: *Schumpeter* (*Joseph*). Der Überschutz an deutschen Frauen und ihre Heiratsaussichten: *May* (*R. E.*). Die Handelsverfassung der norddeutschen Städte im 15. bis 18. Jahrhundert: *Rachel* (*Hugo*). Bismarck und die preussisch-deutsche Freihandelspolitik (1862-1876): *Schneider* (*Oswald*). Leibniz als Volkswirt, ein Bild aus dem Zeitalter des deutschen Merkantilismus: *Salz* (*Arthur*). Sinn und Wert des Marxismus: *Jäger* (*Georg*). Die Ravensberger Leinenindustrie und ihre Tochtergewerbe. Eine Studie zur Entstehung von Industrien auseinander: *Potthoff* (*Heinz*). Vom Bankwesen Grossbritanniens: *Schulte* (*August*). Das französische Heimstättengesetz, vom 12. Juli. 1909: *Rudloff* (*Hans L.*). E. Reyer. Ein Sozialphilosoph auf technischer Grundlage: *Kühne* (*Walter*). Die preussische Wahlrechtsreform von 1910 auf dem Hintergrunde des Kampfes zwischen Königtum und Feudalität: *Schmoller* (*Gustav*). Die westdeutsche Eisenindustrie und die Moselkanalisierung: *Schumacher* (*Hermann*). Zur Statistik der Elektrizitätswerke in Deutschland. Eine Erwiderung: *Mombert* (*Paul*).

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Jahrbücher für Nationalökonomie und Statistik (*Conrad's*)—

July—Arbeitslosenstatistik. Kritische Bemerkungen: *Most* (*Otto*). Bestellbauten und Verkaufsbauten: *Wolff* (*Hellmuth*). Die Berufsgebürtigkeit in Halle a. S. 1909: *Busch* (*M.*). Die wirtschaftliche Gesetzgebung der deutschen Bundesstaaten im Jahre 1909. (Fortsetzung). Die Petroleumgewinnung in den Vereinigten Staaten: *Schultze* (*Ernst*). Wirtschaftsverhältnisse des Commonwealth of Australia: *Kreuzkam* (*Dr.*). Die Durchführung der Vorschriften vom 19. Dezember 1908 über die Arbeitsverhältnisse in der Gross-Eisenindustrie: *Kestner* (*Fritz*). Stillhäufigkeit und soziale Verhältnisse: *Seutemann* (*Karl*).

August—Die Zukunft der Wirtschaftsgeschichte: *Brodnitz* (*Georg*). Der gegenwärtige Stand der Kartellbewegung in Russland: *Goldstein* (*J.*). Bankreform und Zentralbankproblem in Amerika: *Lie* (*Herman*). Die wirtschaftliche Gesetzgebung der deutschen Bundesstaaten im Jahre 1909. (Schluss): *Stöwesand* (*Walther*). Die statistische Behandlung der Anstaltshaushaltungen: *Haacke* (*Heinrich*). Norddeutscher Lloyd und Hamburg-Amerika-Linie in den Jahren der letzten Krisis (1907-09): *Lenz* (*Friedrich*). John Law als Währungspolitiker: *Weyhmann* (*Alfred*).

September—Zur Kritik der Reichswertzuwachssteuer: *Diehl* (*Karl*). Die wirtschaftliche Gesetzgebung der deutschen Bundesstaaten im Jahre 1909. J.-A. Blanqui—der erste Verkünder der Idee des internationalen Arbeiterschutzes: *Krawtschenko* (*N.*). Die Nachtarbeit jugendlicher Arbeiter in Walzwerken, Hammerwerken und Glashütten: *Kestner* (*Fritz*). Zur Geschichte der Grundbesitzverteilung in den älteren östlichen Provinzen Preussens: *Goldschmidt* (*Hans*).

October—Deutschlands wirtschaftliche Zukunft in Krieg und Frieden: *Dix* (*Arthur*). Hermann Heinrich Gossen und seine Lehre. Zur hundertsten Wiederkehr seines Geburtstages am 7. September 1910: *Liefmann* (*Robert*). Die Beschlüsse der Reichstagskommission zur Vorberatung der Reichsversicherungsordnung: *Wagner* (*M.*). Die Liquidität der Kreditgenossenchaften: *Eichhorn* (*Friedrich*). Der Arbeitsmarkt der Redakteure: *Stoklossa* (*Paul*). Bekämpfung des Borgunwesens: *Müffelmann* (*Leo*).

Vierteljahrshefte zur Statistik des Deutschen Reichs, 1910. *Heft* 3—Konkurse im Jahre 1909. Kriminalstatistik (Heer und Marine) 1909. Auswärtiger Handel 1909.

Zeitschrift des Königlich Preussischen Statistischen Landesamts, 1910—

Abteilung 2—Die langfristigen Anleiheschulden der preussischen Städte und der mehr als 10,000 Einwohner zählenden preussischen Landgemeinden nach dem Stande vom 31. März 1906: *Tetzlaff* (*Dr. Oskar*). Die Hypothekenbewegung in Preussen im Zeitraume 1904 bis 1908: *Kühnert* (*Prof. Dr. F.*). Kalenderreform: *Foerster* (*Prof. Dr. Wilhelm*). Die preussischen Aktiengesellschaften mit an der Berliner Fondsbörse zugelassenen Aktien: *Kühnert* (*Dr. F.*).

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Zeitschrift für Socialwissenschaft, 1910—

Heft 7—Die Entstehung und geschichtliche Bedeutung der Wanderhirten. (Nomaden) 1 (*continued in next issue, Heft* 8): *Hahn* (*Ed.*). Beiträge zur Theorie des Kapitalzinses. VII. (Schluss): *Oswalt* (*H.*). Moderne Sparkassenprobleme: *Knebel-Doeberitz* (*Hugo*).

Heft 8—Die wirtschaftliche Spekulation. 1 (*continued in issues of Heft* 9 *and* 10): *Voigt* (*A.*). Die Bevölkerungsbewegung im westlichen Canada: *Schultze* (*Ernst*).

Heft 9—Gobineaus Rassenwerk und die moderne Gobineauschule: *Schallmayer* (*W.*). Die Anfänge des Postwesens: *Brüner* (*Karl*).

Heft 10—Krankheits- und Sterblichkeitsverhältnisse nach dem Beruf in Leipzig. I: *Prinzing* (*F.*). Das Problem der sozialen Reformen in Indien: *Mackay* (*Frhr. von*). Volksvermehrung und Volksverminderung bei den Naturvölkern und ihre Ursachen. 1: *Berkusky* (*J.*).

Zeitschrift für die gesamte Staatswissenschaft. Heft 4. 1910—Zur erkenntnistheoretischen Grundlegung des Verfassungsrechtes: *Schubert-Soldern* (*Richard*). Zur rechtlichen Bedeutung des Tarifvertrags: *Weigelt* (*K.*). Die persönlichen Dienstleistungen im Lichte einer organischen Gesellschaftsauffassung: *Meszlény* (*Arthur*). Das Sparkassenwesen im Königreich Sachsen: *Seidel* (*Dr.*). Das Unterstützungswesen der nordamerikanischen Gewerkschaften: *Fehlinger* (*H.*). Das amtliche Anzeigenwesen in der Schweiz: *Kootz* (*Robert*). Zur Frage der Verbrauchsbelastung. Eine Entgegnung: *Gerloff* (*Wilhelm*).

Zeitschrift für die gesamte Versicherungs-Wissenschaft. October, 1910—Die Frau in der Reichsversicherungsordnung: *Hahn* (*A.*). Die neuen Versicherungsbedingungen (IV. Unfallversicherung, V. Einbruchdiebstahl-Versicherung): *Hagen* (*Otto*). Rationelle Rückkaufswerte: *Engelbrecht* (*Dr.*). Näherungsformeln für den Risikogewinn in der Todesfall-, Invaliditäts- und Rentenversicherung: *Böhmer* (*Dr.*). Über den angeblichen Zusammenhang zwischen Fehlerausgleichung und Untersterblichkeit: *Bortkiewiz* (*Prof. Dr.*).

ITALY—

Giornale degli Economisti, 1910—

March—Sul carattere delle leggi statistiche: *Turroni* (*C. Bresciani*). L'identità della pressione teorica di qualunque imposta a parità di ammontare e la sua semeiotica: *Pantaleoni* (*M.*). Contributo allo studio degli effetti dei dazi doganali: *Carano-Donvito* (*G.*). Per una statistica delle assicurazioni in Italia: *Beneduce* (*A.*). Considerazioni analitiche sulla "boule de neige": *Amoroso* (*L.*).

April—Natura economica e disciplina giuridica dei sindacati fra aziende: *Arias* (*G.*). Dell' influenza delle coalizioni operaie sull' aumento del saggio dei salari (*continued in May*, 1910, *issue*): *Chessa* (*F.*). Basilicata e Calabria secondo le statistiche demografiche (*continued in June*, 1910, *issue*): *Mortara* (*G.*).

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Giornale degli Economisti, 1910—*Contd.*

May—La finanza del nuovo regno d' Italia e i suoi effetti sulle condizioni delle classi rurali nel Mezzogiorno e in Sicilia: *Carano-Donvito* (*G.*). Il quarto canone di Stuart Mill relativo al capitale: *Amoroso* (*L.*). Di un teorema sull' applicazione delle medie a serie statistiche di quantità reciproche: *Vecchio* (*G. S. Del*).

June—Le imposte sugli incrementi di valore nei capitali e sulle rendite nei redditi: *Griziotti* (*B.*).

July—Metodi elementari per lo studio delle distribuzioni di caratteri: *Mortara* (*G*,). L'esercizio ferroviario di Stato: *Trevisonno* (*N.*). Ancora a proposito del peculati perpetrati negli uffici centrali della Direzione generale delle ferrovie di Stato: *Ingenuo* (*U.*). Le imposte sugli incrementi di valore nei capitali e sulle rendite nei redditi: *Griziotti* (*B.*). Leggi sulla moneta in Cina: *Boezi* (*G.*).

August—Teoria della esportazione del capitale: *Vecchio* (*G. Del*). L'Entropia economica elementare: *Sella* (*E.*). Le imposte sugl' incrementi di valore nei capitali e sulle rendite nei redditi: *Grizotti* (*B.*). Il debito ipotecario italiano: *M.* (*G.*). Le finanze delle citta' italiane: *M.* (*G.*). Sul raccolto del frumento in Italia: *M.* (*G.*).

Riforma Sociale, 1910—

March-June—L'Italia economica nell' anno 1909: *Bachi* (*Riccardo*). Il problema delle abitazioni e la produttivita dei muratori: *Schiavi* (*A.*). Terre nuove d' Italia (le Bonifiche nel Ferrarese): *Prato-Previde* (*G. C.*). Provincializzazione e statizzazione: *Corniani* (*G.*).

July-August—Gli insegnamenti d' una regolamentazione arbitraria di prezzi nelle borse del cotone americano: *Prato* (*G.*). Le deformazioni nell' imposta di ricchezza mobile: *Lia* (*Antonio*). L' industria dello sciopero: *Salucci* (*Arturo*). Considerazioni intorno all' opportunità di abolire il ballottaggio: *Locatelli* (*Anton Felice*).

September-October—Su la riforma del regime fiscale delle società per azioni: *Geisser* (*Alberto*). La crisi nell' industria serica: *Cabiati* (*A.*).

Rivista Italiana di Sociologia. May-August, 1910—Le azioni non logiche: *Pareto* (*V.*). La crisi psicologica del socialismo: *Michels* (*R.*). Intorno ad una moderna metodologia delle scienze sociali: *Pietri-Tonelli* (*A. de*). Religione e nazionalità nella scelta matrimoniale: *Savorgnan* (*F.*).

SWITZERLAND—

Journal de Statistique Suisse, 1910. *Lieferung* 4—Statistique de l'impôt de l'Union des villes suisses pour 1909: *Steiger* (*J.*). Statistique des caisses d'épargne de la Suisse, 1908.

LIST OF ADDITIONS TO THE LIBRARY.

During the period that has elapsed since July 7, 1910, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Argentine Republic—

Cordoba. Censo general de la poblacion, edificacion, industria, ganaderia y agricultura de la Ciudad de Cordoba. Levantado en los 31 Agosto y 1 de Septiembre de 1906. 8vo. 1910. (The Municipal Statistical Bureau.)

Austria—

Statistik der hauszinssteuerpflichtigen Wohnungen nach dem Stande von 1908. 8vo. 1909. (The Ministry of Finance.)

Statistik über die Ergebnisse des Arbeiterwohnungsgesetzes ex 1902 in den Jahren 1902 inklusive 1908. 8vo. 1901. (*Id.*)

Belgium—

Agriculture. Recensement agricole de 1908. Répartition et rendement des cultures. Amendments et engrais commerciaux. Denrées alimentaires du commerce utilisées pour le bétail. Relevés des existences, des pertes et des naissances des espèces chevaline, bovine et porcine. Répartition des exploitations agricoles d'après leur étendue. Partie analytique et partie documentaire. 2 vols., 8vo. 1910. (The Ministry of Agriculture.)

Catalogue de la Bibliothèque de la Commission Centrale de Statistique. Tome VI. 8vo. 1910. (The Administration of General Statistics.)

Labour. Monographies industrielles. Aperçu économique, technologique et commercial. Groupe III. Industries de la construction méchanique. Tome 1. Organisation des ateliers. Matières premières. Technologie générale. 8vo. 1910. (The Belgian Labour Department.),

Brazil—

Commissão d'expansão economica do Brazil. Brazil, its natural riches and industries (foreign edition). Vol. 1 Preface. Productive industry. La. 8vo. Paris, 1910. (The Commission.)

Denmark—

Coopération dans l'agriculture en Danemark. Publié par le Bureau statistique de l'État. 30 pp., 8vo. 1910. (The State Statistical Bureau.)

Le mouvement coopératif en Danemark. Publié à l'occasion du 1^er^ Congrès international des associations agricoles et de démographie rurale (Bruxelles 1910). 41 pp., 8vo. 1910. (*Id.*)

France—

Census. Resultats statistiques du Recensement général de la population effectué le 4 Mars 1906. Tome II. Population présente : régions du nord, de l'est et du sud-est. 4to. 1909. (The French Labour Department.)

Labour. Conseil Supérieur du Travail. Session de 1910. Salaire minimum pour les ouvrières à domicile. Rapport de M. Honoré au nom de la Commission permanente. Procès-Verbaux des Séances de la Commission permanente. Documents. Sm. 4to. 1910. (*Id.*)

Germany—

Census. Berufs und Betriebszählung, 1907. Berufsstatistik. Abteilung II. Heft 1. Die Reichsbevölkerung nach Alter, Familienstand und Religionsbekenntnis-Witwen und Waisen. Abteilung II. Heft 2. Alter und Familienstand in einigen besonderen Berufen. 2 vols., 4to. 1910. (The Imperial Statistical Bureau.)

(a) **Foreign Countries**—*Contd.*

Germany—*Contd.*

Census. Berufs und Betriebszählung, 1907. Berufsstatistik. Abteilung VI. Grossstädte. Heft 2. 4to. 1910. (The Imperial Statistical Bureau.)

—— Abteilung IX. Die Bevölkerung nach Hauptberuf und Gebürtigkeit. Teil 1. Landesteile. Abteilung IX. Die Bevölkerung nach Hauptberuf und Gebürtigkeit. Teil 2. Grossstädte. 2 vols., 4to. 1910. (*Id.*)

—— Gewerbliche Betriebsstatistik. Abteilung 1. Heft 2. Die in den Betrieben beschäftigten Personen- Das Hausgewerbe- Offene Verkaufsstellen- Haupt und Zweiggeschäfte. 4to. 1910. (*Id.*)

—— Abteilung II. Heft 2. Reichsübersichten. Motoren in Gesamtbetrieben. Unternehmungsformen. Betriebe in der Hand eines Inhabers. Öffentliche Betriebe. 4to. 1910. (*Id.*)

—— Abteilung IV. Bundestaaten: Offene Verkaufsstellen. Motoren. Öffentliche Betriebe. 4to. 1910. (*Id.*)

—— Abteilung V. Grossstädte. Heft 2. 4to. 1910. (*Id.*)

Insurance. Amtliche Nachrichten des Reichs-Versicherungsamts, 1910. Beiheft 1, Teil 1. Gewerbe-Unfallstatistik für 1907. Teile 1—2. 3 vols., 4to. 1910. (The Imperial Insurance Bureau.)

—— Amtliche Nachrichten des Reichs-Versicherungsamts, 1910. Beiheft 2. Statistik der Heilbehandlung bei den Versicherungsanstalten und zugelassenen Kasseneinrichtungen der Invalidenversicherung für die Jahre 1905-09. 4to. 1910. (*Id.*)

Labour. Sonderbeilage zum "Reichs-Arbeitsblatt" Nr. 8. August 1910. Die Tarifverträge im Jahre 1909. 61 pp., 4to. 1910. (The German Labour Department.)

—— Beiträge zur Arbeiterstatistik Nr. 11. Wohnungefürsorge in deutschen Stadten. 8vo. 1910. (*Id.*)

Bavaria—

Agriculture. Die Landwirtschaft in Bayern. Nach der Betriebszählung, 1907. La. 8vo. 1910. (The Board of Agriculture and Fisheries.)

Births, &c. Die eheliche und uneheliche Fruchtbarkeit mit besonderer Berücksichtigung Bayerns. (Heft 71 der Beiträge zur Statistik des Königreichs Bayern.) 8vo. 1909. (The Statistical Bureau.)

Frankfort. Die Arbeitslosennotstandsaktion im Winter 1908-09. Bericht über die Tätigkeit des Ausschusses zur Beratung von Massnahmen zur Milderung der Arbeitslosigkeit in Frankfurt am Main. 4to. 1910. (The "Soziales Museum," Frankfurt a. M.)

Hamburg. Statistische Mitteilungen über den hamburgischen Staat. Nr. 1. Die Bevölkerung des hamburgischen Staates und der Stadt Hamburg nach Beruf und Stellung am 12 Juni 1907. La. 8vo. 1910. (The Statistical Bureau).

Deutscher Arbeitgeberbund für das Baugewerbe. Die Preise wichtiger Lebensmittel und kleiner Wohnungen in 450 deutschen Orten. Herausgegeben im Dezember 1909. Oblong 4to. 1910. (Purchased.)

—— Zusammenstellung der bei den deutschen Arbeitgeber-Verbänden des Baugewerbes bestehenden Arbeitsbedingungen und Einrichtungen herausgegeben im Dezember 1909. Oblong 4to. 1910. (*Id.*)

Schriften des deutschen Vereins für Armenpflege und Wohltätigkeit. Heft. 91 Stenographischer Bericht über die Verhandlungen der 29. Jahresversammlung des deutschen Vereins für Armenpflege und Wohltätigkeit am 23 und 24 September 1909 im München. Teil 2: Die öffentliche Armenpflege auf dem Lande. 92 pp., 8vo. 1909. (Messrs. Duncker and Humblot.)

Hungary—

Aperçu de la législation concernant l'administration de l'agriculture hongroise par M. le Dr. Gustave de Ladik. Édition du Ministère Roy. Hong. de l'agriculture. No. 8. 8vo. 1910. 3 copies. (The Ministry, per Mr. A. de Than.)

Mouvement de la Navigation et des Marchandises à Fiume en 1908. 8vo. 1910. (The Central Statistical Office.)

Statistique Criminelle des Pays de la Sainte Couronne Hongroise dans les Années 1904-08. 8vo. 1910. (*Id.*)

(a) **Foreign Countries**—*Contd.*

Italy—

Navy. Statistica sanitaria dell' Armata per gli anni 1905 e 1906. Fol. 1910. (The Director-General of Statistics.)

Società Umanitaria, Milano. Disoccupazione collocamenti sussidi in Milano, nel 1909. 39 pp., 8vo. 1910. (The Society.)

Netherlands—

Verslag betreffende de werking en de toepassing van de wettelijke voorschriften en den gang van den dienst in de verschillende districten der Scheepvaart-inspectie over 1909. 7 pp.. 8vo. 1910. (The Ministry of Agriculture, &c.)

Norway—

Agriculture. Recensement agricole du 30 Septembre 1907 : II. Étendue des exploitations, superficie cultiveé, chiffres proportionnels, &c. 8vo. 1910. (The Central Statistical Bureau.)

Joint Stock Companies. Sociétés par actions. Renseignements provisoires. 1892 and 1906. 8vo. 1910. (*Id.*)

Population. Population de la Norvège répartie sur les différentes années d'âge, 1846-1901. 8vo. 1910. (*Id.*)

Paraguay—

Guia general del Paraguay. 5a. edición editada en el año 1910. Sm. 8vo. 1910. (The Director-General of Statistics.)

Mensaje del Vicepresidente de la Republica en ejercicio del P.E. al Honorable Congreso en la apertura del xl periodo legislativo. Abril 1 de 1910. 55 pp., 8vo. 1910. (*Id.*)

Russia—

St. Petersburg. Données concernant la marche de l'épidemie cholérique. 6 pp., 4to. 1910. (The Statistical Bureau.)

Sweden—

Labour. Arbetslösheten i Sverige under Vintern 1908-1909. 8vo. 1910. (The Swedish Labour Department.)

Statistiska Kommitténs Betänkande. Sveriges Officiella Statistik och dess Allmänna Organisation. 460 pp., 8vo. (The Committee.)

Stockholm—

Enquête statistique sur les budgets de ménage à Stockholm en 1907-1908. 4to. Stockholm. 1910. (The Municipal Statistical Bureau.)

Quelques données statistiques publiées par le Bureau de Statistique de la ville. Edition 1910. Sm. 8vo. 1910. (*Id.*)

Switzerland—

Schweizerische Aerztliche Mitteilungen aus Universitäts-Instituten. (Contains) Die Frage der Wirkung des Alkohols auf die Stillunfähigkeit der Frauen in Zurich. Von. Dr. R. Raitz. 108 pp., 8vo. 1910. (Gebr. Leemann and Co., Zurich).

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—— Special Reports. Religious Bodies 1906. Part 1. Summary and General Tables. 4to. 1910. (*Id.*)

—— Special Reports. Religious Bodies : 1906. Part 11. Separate Denominations : History, Description, and Statistics. 4to. 1910. (*Id.*)

—— Special Reports. Central Electric Light and Power Stations : 1907. 4to. 1910. (*Id.*)

—— Special Reports. Street and Electric Railways : 1907. 4to. 1910. (*Id.*)

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United States—*Contd.*

Manufactures, Bureau of. Tariff Series No. 25. Customs Tariff of France. With introduction by Frank R. Rutter. 8vo. 1910. (The Department of Commerce and Labour)

Massachusetts. Report on Commission on Old Age Pensions, Annuities and Insurance. January, 1910. 8vo. 1910. (The State Library.)

Nebraska. Census of Farms. Acreage of Crops. Orchard Statistics. Live Stock Statistics. Nebraska. Bulletin No. 20. 1910. 31 pp., 8vo. 1910. (The Bureau of Labor and Industrial Statistics.)

American Economic Association. Quarterly. Child Labor Policy of New Jersey: *Arthur S. Field.* October, 1910. 8vo. 1910. (The Association.)

Columbia University Studies—

Vol. 36. No. 2. The Transition in Virginia from Colony to Commonwealth: *Charles R. Lingley.* 8vo. 1910. (Messrs. P. S. King and Son.)

Vol. 37. No. 1. Standards of Reasonableness in Local Freight Discriminations: *John M. Clark.* 8vo. 1910. (*Id.*)

Vol. 37. No. 2. Legal Development in Colonial Massachusetts. 1630-1686: *Charles J. Hilkey.* 8vo. 1910. (*Id.*)

Vol. 37. No. 3. Social and Mental Traits of the Negro. Research into the Conditions of the Negro Race in Southern Towns. A study in Race Traits, Tendencies and Prospects: *Howard W. Odum.* 8vo. 1910. (*Id.*)

Vol. 38. No. 1. The Public Domain and Democracy. A study of social, economic and political problems in the United States in relation to Western Development: *Robert T. Hill.* 8vo. 1910. (*Id.*)

Vol. 38. No. 2. Organismic Theories of the State. Nineteenth Century Interpretations of the State as Organism or as Person: *F. W. Coker.* 8vo. 1910. (*Id.*)

Vol. 39. No. 1. The Making of the Balkan States: *William S. Murray.* 8vo. 1910. (*Id.*)

International—

Institut International d'Agriculture. Statistique des superficies cultivées de la production végétale et du bétail dans les pays adhérents. Essai d'inventaire d'après les documents publiés par les États. La. fol. 1910. (The Institute.)

(Another copy presented by the Board of Agriculture and Fisheries.)

—— Bulletin of the Bureau of Economic and Social Intelligence. First year. First volume. No. 1, September 30, 1910. 8vo. 1910. (*Id.*)

International Federation of Master Cotton Spinners. Official Report of reception by the Rt. Hon. Viscount Morley of a deputation of Lancashire Members of Parliament and of Indian and Lancashire Master Cotton Spinners and Manufacturers at the India Office, Whitehall, July 27, 1910. 20 pp., 8vo. 1910. (The Secretary.)

—— Statistics of consumption of cotton for year ending August 31, 1910, and of stocks of cotton in spinners' hands on August 31, 1910. 16 pp., 8vo. 1910. (*Id.*)

Seventh International Congress of delegated representatives of Master Cotton Spinners' and Manufacturers' Associations, held at Brussels, June 6, 7 and 8, 1910. Official report. 8vo. 1910. (The Secretary.)

(b) India and Colonies.

India, British—

Coal. Note on production and consumption of coal in India up to 1909. Fol. 1910. (The Director-General of Commercial Intelligence.)

Prices. Variations in Indian price levels from 1861 to 1909, expressed in index-numbers. Fol. 1910. (*Id.*)

Trade. Supplement to Indian Trade Journal, September 22, 1910. Seaborne trade of India. A note showing for seven years ending 1909-10 the estimated value of imports and exports of British India at prices prevailing in 1903-04. 4to. 1910. (*Id.*)

(b) India and Colonies—*Contd.*

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Paludism: the transactions of Committee for Study of Malaria in India. Issued under authority of the Government of India, by the Sanitary Commissioner. No. 1. July, 1910. 8vo. 1910. (Mr. P. Gurkha.)

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British South Africa—

Transvaal Colony. Final Report of the Mining Regulations Commission. Vol. 1. Report, 1910. Fol. 1910. (The Government Printing Office.)

Canada, Dominion of—

Prices. Wholesale Prices in Canada, 1890-1909 (inclusive). Special Report by R. H. Coats, B.A. La. 8vo. Ottawa, 1910. (Department of Labour).

(c) United Kingdom and its several Divisions.

United Kingdom—

Accidents. Report of Royal Commission on causes of accidents, fatal and non-fatal, to servants of railway companies and of truck owners. Part 1. Report. [Cd-41.] 1900. (Purchased.)

Agricultural Credit Societies. Number of members, total assets, &c. (166.) 1910. (*Id.*)

Banks. Report from Select Committee of House of Lords on Thrift and Credit Banks Bill (H.L.), with Proceedings of Committee and Minutes of Evidence. (96.) 1910. (*Id.*)

Bills of Exchange. Commercial No. 4. (1910.) Correspondence relating to Conference on Bills of Exchange at The Hague, June, 1910. [Cd-5224.] 1910. (*Id.*)

Canada and West Indies. Report of Royal Commission on Trade Relations between Canada and the West Indies. [Cd-5369.] 1910. Minutes of Evidence taken in Canada, and Appendices. [Cd-4991.] 1910. Part 3, Minutes of Evidence taken in the West Indies, and Appendices. [Cd-5370.] 1910. Part 4, Minutes of Evidence taken in London, and Appendices. [Cd-5371.] 4 vols. (*Id.*)

Canals. Royal Commission on Canals and Waterways. Vol. viii. Appendices to Fourth and Final Report (England and Wales and Scotland) of the Commission. [Cd-5204.] 1910. (*Id.*)

Census of Production (1907) Preliminary Tables, summarising Results of Returns received under the Census of Production Act, 1906. Part 4. Iron mines, Iron and Steel manufactures, &c. [Cd-5254.] 1910. (The Census of Production Office.)

—— Part 5. Grain-milling factories, Bread and Biscuit factories and workshops, Army Bakeries, &c. [Cd-5397.] 1910. (*Id.*)

Civil List. Report from Select Committee on the Civil List, with Proceedings of the Committee and Appendices. (211.) 1910, (Purchased.)

Commercial Travellers. Memorandum summarising Regulations in Force in British India, British Self-governing Dominions, the Crown Colonies and Protectorates, and in Foreign Countries with regard to British Commercial Travellers. [Cd-5189.] 1910. (*Id.*)

(c) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Coroners Committee. First Report of Departmental Committee appointed to inquire into the law relating to Coroners and Coroners' Inquests, and into the practice in Coroners' Courts. Part 1. Report. [Cd-4781.] Part 2. [Cd-4782.] 1909. Second Report. Part 1. Report. [Cd-5004.] Part 2. Evidence. [Cd-5139.] 1910. 4 vols. 1910. (Purchased.)

Deaths of Seamen and Fishermen reported to Board of Trade in year ended June 30, 1909. [Cd-5377.] 1910. (The Marine Department, Board of Trade.)

Education. Royal Commission on University Education in London. 1st Report. [Cd-5156.] 1910. Appendix to 1st Report. Minutes of Evidence, July, 1909—April, 1910, with Appendices and Index. [Cd-5166.] 1910. (Purchased.)

Employment of Children Act, 1903. Report of Departmental Committee. [Cd-5229.] 1910. (*Id.*)

—— Minutes of Evidence taken before the Committee, with Appendices and Index. [Cd-5230.] 1910. (*Id.*)

Finance (1909-10) Act, 1910. Additional Taxation (Ireland). (128.) 1910. (*Id.*)

—— Super-Tax. Copy of Regulations made by Commissioners of Inland Revenue under Sec. 72 (8). (156.) 1910. (*Id.*)

Illiterate Voters (General Election, 1910). (283.) 1910. (*Id.*)

International Agricultural Institute. Copy of further papers relative to the Institute in continuation of Parliamentary Paper [Cd-4727.] [Cd-5339.] 1910. (*Id.*)

Labour. Report on Collective Agreements between Employers and Workpeople in the United Kingdom. [Cd-5366.] 8vo. 1910. (The Board of Trade.)

Land Valuation. Return required to be filled up by Owners of Land under Section 26 of the Finance (1909-10) Act, 1910, with Instructions. [Cd-5262.] 1910. (Purchased.)

Mines. Royal Commission on Mines. First Report (Cd-3548.) Second Report [Cd-4820.] 2 vols. 1909. (The Commission.)

—— Minutes of Evidence taken before the Commission, with Index and Appendices. Vol. 1. [Cd-3549.] Vol. 2. [Cd-3873.] Vol. 3. [Cd-4349.] Vol. 4. [Cd-4667.] 4 vols. 1909. (*Id.*)

—— Codes of Rules in force in mines and quarries in the United Kingdom, 1908. Fol. 1908. (*Id.*)

—— Report of a Committee appointed by the Commission to inquire into causes of, and means of preventing, accidents from falls of ground, underground haulage, and in shafts. [Cd-4821.] 1909. (*Id.*)

Old Age Pensions Act, 1908. Financial instructions for Pension Committees and Sub-Committees, revised April 1, 1910. [Cd-5184.] 1910. (Purchased.)

Poor. Royal Commission on Poor Laws and Relief of Distress. Appendix Vol. 9. Minutes of Evidence (140th to 148th days, 150th to 156th days, and 158th day) with appendix. [This volume contains the oral and written evidence of witnesses further relating to unemployment, &c.] [Cd-5068.] 1910. (The Commission.)

—— Appendix Vol. 9 A. Index to Minutes of Evidence. (Appendix Vol. 9.) [Cd-5069.] 1910. (*Id.*)

—— Appendix Vol. 10. Minutes of Evidence (157th and 159th days) with appendix. [Contains evidence of witnesses relating to Ireland.] [Cd-5070.] 1910. (*Id.*)

—— Appendix Vol. 10 A. Index to Minutes of Evidence. (Appendix Vol. 10.) [Cd-5071.] 1910. (*Id.*)

—— Appendix Vol. 21. Report on an Inquiry in Certain Unions into Cases of Refusal of Out-Relief by Miss G. Harlock. [Cd-5074.] 1910. (*Id.*)

—— Appendix Vol. 23. Report on Condition of Children who are in receipt of various forms of Poor Law Relief in certain Parishes in Scotland. By C. T. Parsons, M.D., assisted by Mary Longman and Marion Phillips. [Cd-5075.] 1910. (*Id.*)

(c) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Poor. Royal Commission on Poor Laws and Relief of Distress. Appendix Vol. 24. Report on Physical Condition of Able-bodied Male Inmates of certain Scottish Poorhouses, and English Workhouses and Labour Yards. By C. T. Parsons, M.D. [Cd-5076.] 1910. (The Commission.)

—— Appendix Vol. 29. Church of Scotland. Report from General Assembly's Committee on Church Interests, with appendix. [Cd-5243.] 1910. (*Id.*)

—— Appendix Vol. 32. Reports on visits paid by The Labour Colonies Committee to certain institutions in Holland, Belgium, Germany, and Switzerland. [Cd-5199.] 1910. (*Id.*)

Railways. Reports of Committee appointed by Board of Trade to examine and, where necessary, to test, appliances designed to diminish danger to men employed in railway service, with appendices. [Cd-3638.] 1907. (Purchased.)

Royal Commissions. Report of Departmental Committee on Procedure of Royal Commissions. [Cd-5235.] 1910. (*Id.*)

Small Holdings. Numbers, rents, &c. (145.) 1910. (*Id.*)

Trade. Certificates of Origin for imported goods. Memorandum showing Regulations existing in British India, British self-governing Dominions, the Crown Colonies and Protectorates, and in Foreign Countries in regard to. [Cd-5347.] 1910. (*Id.*)

Water. Report from Joint Select Committee on Water Supplies (Protection) Bill (H.L.), with Proceedings of Committee, Minutes of Evidence, and Appendices. (226.) 1910. (*Id.*)

England and Wales—

Local Government Board. Report on Back-to-Back Houses, with introduction by the Medical Officer of the Board. A report on relative Mortality in Through and Back-to-Back Houses in certain Towns in the West Riding of Yorkshire. [Cd-5314.] 8vo. 1910. (Purchased.)

London County Council—

Education Committee. Report by Education Officer submitting report by Miss Durham on Juvenile Labour in Germany and how it is being dealt with. Fol. 1910. (The London County Council.)

—— School Dentistry in Germany. Report of Education Officer. Fol. 1910. (*Id.*)

Birmingham. Chamber of Commerce. Income Tax Administration and Reform. Report by the Imperial and Local Finance Committee. 29 pp., 8vo. 1910. (The Chamber of Commerce.)

Scotland—

Bankruptcy. Departmental Committee on Bankruptcy Law of Scotland Amendment. Vol. 1. Report. [Cd-5201.] Vol. 2. Minutes of Evidence. [Cd-5202.] 1910. (Purchased.)

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Albert (*Dr. Hermann*). Die geschichtliche Entwickelung des Zinsfusses in Deutschland von 1895 bis 1908. xii + 210 pp., 8vo. Leipzig. 1910. (Messrs. Duncker and Humblot.)

Andrew (*James Grant*). Age-incidence, sex, and comparative frequency in disease. 439 pp., 8vo. 1909. (Messrs. Bailliere, Tindall, and Cox.)

Ansiaux (*Maurice*). Principes de la politique régulatrice des changes. 259 pp., 8vo. Paris. 1910. (Purchased.)

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Barker (*J. Ellis*). Great and Greater Britain. The Problems of Motherland and Empire, political, naval, military, industrial, financial, social. Second and enlarged edition. xiii + 587 pp., 8vo. 1910. (Messrs. Smith, Elder and Co.)

Bauschinger (*Dr. J.*) and *Peters* (*Dr. J.*). Logarithmic-Trigonometrical Tables, with 8 decimal places . . . Vol. 1. La. 8vo. Leipzig. 1910. (Purchased.)

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Besse (*Pierre*). La crise et l'évolution de l'agriculture en Angleterre de 1875 à nos jours. Essai d'histoire économique. xv + 390 pp., 8vo. Paris. 1910. (M. Felix Alcan).

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Vol. LXXIV.] [Part II.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

JANUARY, 1911.

GREAT BRITAIN'S CAPITAL INVESTMENTS *in* INDIVIDUAL COLONIAL *and* FOREIGN COUNTRIES.

By GEORGE PAISH.

[Read before the Royal Statistical Society, December 20, 1910, the President, the Right Hon. LORD GEORGE HAMILTON, G.C.S.I., in the Chair.]

THIS is the second portion of the paper I had the honour of reading before the Fellows of the Royal Statistical Society in June, 1909. In the first portion I gave the results of my investigation as to the amount of capital which the United Kingdom up to the end of 1907 had invested in other lands, according to the available documentary evidence, and as to the amount of income which in 1907 this country derived from that capital. I have now brought up to the end of 1910 the approximate amount of visible capital which we have supplied to other lands in the aggregate, and I have also ascertained the amount of capital which the United Kingdom has had to place with individual countries, in order to discover the geographical distribution of our colonial and foreign investments.

I pointed out in my last paper that the Inland Revenue Commissioners do not ascertain the amount of income derived by the investors of the United Kingdom from the many miscellaneous enterprises in which they are interested other than Government and Municipal loans, and Indian, Colonial, American and other Foreign Railways, and that to ascertain the large amount of capital which we have supplied to other countries for miscellaneous purposes, such as mining, mortgages, banking, tramways, telegraphs, telephones, tea cultivation, oil, rubber, and nitrate production, and for industrial ventures generally, I examined the reports, balance sheets and income statements of several thousand companies; in fact, I examined the reports of all British companies working abroad about which official information could be obtained. My investigations showed that according to the available documentary evidence the

British capital invested in Indian, colonial and foreign loans and companies, and the income derived therefrom in 1907–08.

	Capital.	Income.	Rate of Interest.
	£	£	Per cent.
Indian Government loans, including rupee loans held in England	156,369,000	5,017,000	3·21
Colonial and provincial Government loans	375,190,000	13,933,000	3·71
Foreign Government loans	167,000,000	8,338,000	4·75
Colonial and foreign municipal stocks	58,901,000	2,650,000	4·5
Indian railways	123,341,000	4,774,000	3·87
Colonial railways	188,950,000	7,598,000	4·0
American railways	600,000,000	27,000,000	4·5
Foreign railways	286,700,000	13,467,000	4·7
Banks	54,101,000	7,353,000	13·6
Breweries and distilleries	17,205,000	732,000	4·2
Canals and docks	5,974,000	1,174,000	19·9
Commercial, industrial, &c.	77,610,000	4,863,000	6·3
Electric lighting and power	7,686,000	321,000	4·2
Financial, land and investment	187,027,000	6,233,000	3·3
Gas	16,419 000	1,194,000	7·3
Mines—			
Coal and iron ore	12,956,000	505,000	3·9
Copper	38,525,000	5,074,000	13·2
Diamonds and other stones	14,646,000	4,468,000	30·5
Gold	161,178,000	14,947,000	9·3
Silver, lead, and zinc	10,513,000	843,000	8·0
Tin and miscellaneous	5,568,000	308,000	5·5
Nitrate	10,903,000	1,637,000	15·0
Oil	14,268,000	642,000	4·5
Rubber	5,433,000	446,000	8·2
Tea and coffee	21,399,000	1,794,000	8·4
Telegraphs and telephones	34,235,000	2,233,000	6·5
Tramways	35,289,000	1,809,000	5·1
Waterworks	6,352,000	438,000	6·9
Total	2,693,738,000	139,791,000	5·2

amount of capital invested by Great Britain in India, the colonies and foreign countries up to the end of 1907 was 2,693,738,000*l.*, of which 1,312,000,000*l.* was invested in the colonies and India and 1,381,000,000*l.* in foreign countries, and that this capital was bringing to the country an income of 139,791,000*l.* per annum, equal to a return of 5·2 per cent. It may assist the understanding of the matter if I reproduce (see page 168) the statement which I gave in my previous paper of the amount of British capital invested up to the end of 1907, the purposes for which it was supplied and the income derived therefrom in 1907.

In the three years since 1907 Great Britain has supplied other lands with a large amount of additional capital. In 1908 the amount of the new capital issues in London on behalf of Colonial and foreign Governments, municipalities, railways, banks, mining and other joint stock industrial companies was 146,000,000*l.* In 1909 it was 182,000,000*l.* And in 1910, to date, the amount is no less than 189,000,000*l.* The following statement shows the countries to which we have supplied capital so freely in the past three years and the amounts obtained by each. These amounts are calculated at the price of issue, not at the nominal value of the securities:—

New issues of capital in London for Colonial and foreign countries in the past three years.

	1910.	1909.	1908.	Total three years.
The Colonies and India.	£	£	£	£
America—				
Canada	32,359,158	37,687,464	31,309,558	**101,356,180**
British Guiana	367,000	176,500	—	**543,500**
British Honduras	50,000	—	—	**50,000**
Newfoundland	1,410,000	—	—	**1,410,000**
West Indies	340,000	390,600	124,144	**854,744**
Total America	34,526,158	38,254,564	31,433,702	**104,214,424**
Australasia—				
New South Wales	829,000	4,730,559	1,766,908	**7,326,467**
New Zealand	5,258,717	849,135	645,717	**6,753,569**
Queensland	75,000	1,990,000	—	**2,065,000**
South Australia	897,294	117,600	—	**1,014,894**
Tasmania	6,249	295,500	247,000	**548,749**
Victoria	5,000	1,663,000	135,500	**1,803,500**
Western Australia	2,884,686	1,618,925	1,047,833	**5,551,444**
Fiji	30,000	—	—	**30,000**
Unenumerated Australia	194,485	750,000	50,000	**994,485**
Total Australasia	10,180,431	12,014,719	3,892,958	**26,088,108**

New issues of capital in London for Colonial and foreign countries—Contd.

	1910.	1909.	1908.	Total three years.
	£	£	£	£
Africa—				
British Central Africa	77,500	—	—	**77,500**
British East Africa	293,019	10,000	10,000	**313,019**
British West Africa	2,490,906	1,899,003	3,382,992	**7,747,901**
Seychelles	68,000	—	—	**68,000**
South Africa—				
Cape Colony	5,693	278,550	2,598,354	**2,882,597**
Natal	405,000	285,000	802,500	**1,492,500**
Orange River Colony	66,100	—	73,500	**139,600**
Rhodesia	6,686,176	2,422,050	1,526,323	**10,634,549**
Transvaal	2,767,828	8,858,093	2,487,435	**14,113,356**
Unenumerated South Africa	90,000	587,600	349,500	**1,027,100**
Total South Africa	10,020,797	12,431,293	7,837,612	**30,289,702**
Total Africa	12,950,322	14,340,296	11,230,604	**38,521,122**
Asia—				
India and Ceylon	14,720,503	15,884,581	13,469,787	**44,074,871**
Straits Settlements	9,286,337	3,092,513	233,502	**12,612,352**
British North Borneo	848,948	1,159,126	164,000	**2,172,074**
Total Asia	24,855,788	20,136,220	13,867,289	**58,859,297**
Europe—				
Malta	—	—	125,000	**125,000**
Unenumerated Colonies	300,000	250,000	46,000	**596,000**
Total the Colonies and India	**82,812,599**	**84,995,799**	**60,595,553**	**228,403,951**
Foreign Countries.				
Algeria	320,000	—	—	**320,000**
Argentina	16,595,020	23,987,070	15,905,706	**56,487,796**
Austria	2,368,000	130,000	—	**2,498,000**
Belgium	—	80,000	—	**80,000**
Bolivia	611,500	10,000	—	**621,500**
Brazil	10,988,686	7,497,928	10,945,280	**29,431,894**
Bulgaria	3,603,600	—	—	**3,603,600**
Chili	4,684,661	4,158,750	1,379,985	**10,223,396**
China	1,610,100	740,000	5,031,125	**7,381,225**
Colombia	171,500	567,480	906,070	**1,645,050**
Costa Rica	—	—	14,625	**14,625**
Cuba	1,916,153	1,226,000	—	**3,142,153**
Denmark	1,089,000	487,500	2,343,200	**3,919,700**
Dutch Indies	6,328,916	1,195,690	145,300	**7,669,906**
Ecuador	300,000	416,070	—	**716,070**
Egypt	1,002,407	796,670	1,755,400	**3,554,477**
Finland	143,050	2,328,400	—	**2,471,450**
France	755,000	456,667	424,400	**1,636,067**
French Ivory Coast	—	50,000	—	**50,000**
Germany	202,500	47,000	—	**249,500**
German Africa	483,500	60,000	—	**543,500**

New issues of capital in London for Colonial and foreign countries—Contd.

	1910.	1909.	1908.	Total three years.
Foreign Countries—contd.	£	£	£	£
Greece	2,345,834	—	191,000	2,539,834
Hungary	1,950,000	—	—	1,950,000
Italy	55,000	—	160,000	215,000
Japan	31,950	4,230,523	4,880,000	9,142,473
Liberia	9,993	20,000	101,000	130,993
Madagascar	50,000	—	—	50,000
Mexico	4,946,139	9,109,694	7,250,528	21,306,361
Montenegro	—	242,500	—	242,500
Netherlands	82,500	534,000	125,000	741,500
Nicaragua	35,000	460,000	—	495,000
Norway	—	381,150	155,000	536,150
Panama	130,000	200,000	11,000	341,000
Paraguay	—	182,000	186,900	368,900
Persia	—	1,200,000	—	1,200.000
Peru	2,465,770	—	2,037,000	4,502,770
Philippines	403,890	—	1,819,393	2,223,283
Portugal	100,000	80,000	35,000	215,000
Portuguese Africa	275,000	5,000	—	280,000
Roumania	1,202,000	—	—	1,202,000
Russia	3,936,655	9,672,485	3,810,496	17,419,636
Salvador	—	36,000	860,000	896,000
Samoa	33,539	—	—	33,539
Siberia	257,500	—	—	257,500
Spain	158,500	60,000	297,493	515,993
Sweden	—	881,000	2,940,000	3,821,000
Turkey	1,431,688	2,759,381	204,800	4,395,869
United States	32,237,294	21,778,159	19,949,174	73,964,627
Uruguay	337,693	234,980	648,384	1,221,057
Venezuela	10,000	25,000	—	35,000
Unenumerated	679,000	508,750	766,488	1,954,238
Total Foreign Countries	**106,338,538**	**96,835,847**	**85,282,747**	**288,457,132**
Grand Total	**189,151,137**	**181,831,646**	**145,878,300**	**516,861,083**

Usually the Continent participates in the new issues of foreign Government loans and American railway securities, and, to a moderate extent, in other issues, and it is necessary to make allowance for the share of the other lending countries in these issues. After making every allowance it is evident that the actual amount of new capital supplied by Great Britain to other lands in 1908 was 130,000,000*l.*; in 1909, 160,000,000*l.*; and in 1910, 165,000,000*l.*, a total in three years of no less than 455,000,000*l.*

To give a clear notion of the purposes for which capital is now being raised so freely I set out the nature of the new issues of capital in London in the three years 1908, 1909, and 1910:—

Great Britain's capital investments in other lands*, 1908, 1909 *and* 1910.

	1910.	1909.	1908.
	£	£	£
Government loans—			
India and Ceylon	7,237,500	8,752,500	4,950,000
Colonies	13,495,775	24,273,124	14,912,614
Foreign countries	17,275,856	17,749,880	18,251,925
Total	**38,009,131**	**50,775,504**	**38,143,739**
Municipal loans—			
India and Ceylon	487,500	2,048,950	985,000
Colonies	3,964,200	3,487,159	4,652,905
Foreign countries	6,809,514	10,234,011	4,485,512
Total	**11,261,214**	**15,770,120**	**10,123,417**
Railway companies—			
India and Ceylon	3,100,000	3,183,875	6,894,250
Colonies	10,972,497	19,378,402	14,851,476
Foreign countries	42,670,148	39,400,633	43,457,446
Total	**56,742,645**	**61,962,910**	**65,203,172**
Miscellaneous—			
Banks	1,681,039	625,000	2,822,500
Breweries and distilleries	—	—	120,000
Canals and docks	182,000	450,000	—
Commercial, industrial, &c.	10,504,424	8,368,397	5,808,647
Electric lighting and power	3,102,726	2,413,490	1,220,271
Financial, land and investment	13,473,333	4,896,369	8,892,643
Gas and water	102,500	1,578,000	1,339,322
Insurance	246,000	—	—
Iron, coal and steel	4,396,195	2,444,034	1,027,180
Mines	10,802,352	8,300,688	5,084,376
Motor traction and manufacturing	276,149	595,000	58,000
Nitrate	—	145,500	215,700
Oil	10,508,086	2,428,250	795,540
Rubber	20,859,155	5,774,870	810,012
Shipping	—	1,187,500	200,000
Tea and Coffee	104,500	40,000	10,000
Telegraphs and Telephones	2,637,500	3,363,000	150,000
Tramways	4,262,188	10,713,014	3,853,781
Total	**83,138,147**	**53,323,112**	**32,407,972**
Grand Total	**189,151,137**	**181,831,646**	**145,878,300**

* Amount calculated at the price of issue, and exclusive of loans raised to repay former loans and all shares issued to vendors.

A very large portion of the new capital has been raised for railway construction. In the three years the amount of capital raised by railway companies has reached 184,000,000*l*., but to this must be added a large portion of the money raised by Government loans. About 275,000,000*l*. of the 515,000,000*l*. of new issues has been directly or indirectly for the construction, improvement and equipment of Colonial and foreign railways. The nature of the borrowings in the current year, whether Government, municipal, railway or company is disclosed by the next tabular statement:—

The purposes for which each country has required capital in 1910.

	Governments.	Municipalities.	Railways.	Other securities.	Total all securities.
The Colonies and India.	£	£	£	£	£
America—					
Canada	3,647,451	3,443,983	10,402,497	14,865,227	32,359,158
British Guiana	—	—	—	367,000	367,000
British Honduras	—	—	—	50,000	50,000
Newfoundland	780,000	—	—	630,000	1,410,000
West Indies	—	—	—	340,000	340,000
Total America	4,427,451	3,443,983	10,402,497	16,252,227	34,526,158
Australasia:—					
New South Wales	—	—	—	829,000	829,000
New Zealand	4,349,750	520,217	—	388,750	5,258,717
Queensland	—	—	—	75,000	75,000
South Australia	797,294	—	—	100,000	897,294
Tasmania	—	—	—	6,249	6,249
Victoria	—	—	—	5,000	5,000
Western Australia	1,295,030	—	570,000	1,019,656	2,884,686
Fiji	—	—	—	30,000	30,000
Unenumerated Australasia	—	—	—	194,485	194,485
Total Australasia	6,442,074	520,217	570,000	2,648,140	10,180,431
Africa—					
British Central Africa	—	—	—	77,500	77,500
British East Africa	—	—	—	293,019	293,019
British West Africa	—	—	—	2,490,906	2,490,906
Seychelles	—	—	—	68,000	68,000
South Africa—					
Cape Colony	—	—	—	5,693	5,693
Natal	—	—	—	405,000	405,000
Orange River Colony	—	—	—	66,100	66,100
Rhodesia	—	—	—	6,686,176	6,686,176
Transvaal	—	—	—	2,767,828	2,767,828
Unenumerated South Africa	—	—	—	90,000	90,000
Total South Africa	—	—	—	10,020,797	10,020,797
Total Africa	—	—	—	12,950,222	12,950,222
Asia—					
India and Ceylon	7,237,500	487,500	3,100,000	3,895,503	14,720,503
Straits Settlements	2,626,250	—	—	6,660,087	9,286,337
British North Borneo	—	—	—	848,948	848,948
Total Asia	9,863,750	487,500	3,100,000	11,404,538	24,855,788
Unenumerated Colonies	—	—	—	300,000	300,000
Total India and the Colonies	**20,733,275**	**4,451,700**	**14,072,497**	**43,555,127**	**82,812,599**

The purposes for which each country has required capital in 1910—*Contd.*

	Governments.	Muni-cipalities.	Railways.	Other securities.	Total all securities.
Foreign Countries.	£	£	£	£	£
Algeria	—	—	—	320,000	**320,000**
Argentina	2,425,520	—	11,344,000	2,824,500	**16,595,020**
Austria	—	—	—	2,368,000	**2,368,000**
Bolivia	—	—	—	611,500	**611,500**
Brazil	4,400,000	1,343,000	2,661,180	2,584,506	**10,988,686**
Bulgaria	3,603,600	—	—	—	**3,603,600**
Chili	2,574,000	—	2,090,661	20,000	**4,684,661**
China	1,601,550	—	—	8,550	**1,610,100**
Colombia	—	—	—	171,500	**171,500**
Cuba	1,099,066	—	—	817,087	**1,916,153**
Denmark	—	1,089,000	—	—	**1,089,000**
Dutch Indies	—	—	—	6,328,916	**6,328,916**
Ecuador	—	—	—	300,000	**300,000**
Egypt	—	—	—	1,002,407	**1,002,407**
Finland	—	113,050	—	30,000	**143,050**
France	—	—	—	755,000	**755,000**
Germany	—	—	—	202,500	**202,500**
German Africa	—	—	—	483,500	**483,500**
Greece	1,572,120	—	—	773,714	**2,345,834**
Hungary	—	1,910,000	—	40,000	**1,950,000**
Italy	—	—	—	55,000	**55,000**
Japan	—	—	—	31,950	**31,950**
Liberia	—	—	—	9,993	**9,993**
Madagascar	—	—	—	50,000	**50,000**
Mexico	—	178,189	792,000	3,975,950	**4,946,139**
Netherlands	—	—	—	82,500	**82,500**
Nicaragua	—	—	—	35,000	**35,000**
Panama	—	—	—	130,000	**130,300**
Peru	—	—	946,770	1,519,000	**2,465,770**
Philippines	—	—	353,890	50,000	**403,890**
Portugal	—	—	—	100,000	**100,000**
Portuguese Africa	—	—	—	275,000	**275,000**
Roumania	—	760,000	—	442,000	**1,202,000**
Russia	—	—	1,135,039	2,801,616	**3,936,655**
Samoa	—	—	—	33,539	**33,539**
Siberia	—	—	—	257,500	**257,500**
Spain	—	—	—	158,500	**158,500**
Turkey	—	995,000	293,250	143,438	**1,431,688**
United States	—	421,275	22,737,358	9,078,661	**32,237,294**
Uruguay	—	—	315,000	22,693	**337,693**
Venezuela	—	—	—	10,000	**10,000**
Unenumerated	—	—	—	679,000	**679,000**
Total foreign countries	**17,275,856**	**6,809,514**	**42,670,148**	**39,583,020**	**106,338,538**
Grand Total	**38,009,131**	**11,261,214**	**56,742,645**	**83,138,147**	**189,151,137**

The great income which British investors are deriving from their investments in other lands is small in comparison with the total income they may ultimately derive from the investment. A great deal of the capital that has been invested in the past is not yet fully productive, and will probably not become so for many years.

In recent years the income of the British people from foreign investments has grown very rapidly, not merely because of the large amounts of new savings they have placed in other lands, but because of the much higher returns they have derived from the capital formerly invested. It will be recollected that during the nineties many American railways were unable to meet their interest charges, and that others did not pay any dividends on their stocks; in recent years the railways of the United States have met their interest obligations in full, have given considerable dividends upon their stocks which previously received no distribution, and have made higher distributions upon the stocks which continued to receive dividends during the period of depression. The experience of our investors in Argentina and in other countries has been of a similar character. During the nineties dividends were low, and in recent years have been much higher.

In ascertaining the large amounts of capital that Great Britain has supplied to individual colonial and foreign countries, one is compelled to recognise the powerful influence which Great Britain has exerted in developing the world's natural resources by supplying other countries freely with the funds for railway construction, for mining, and for the production of every kind of natural wealth. It is no exaggeration to state that Great Britain's enterprise in placing her supplies of new capital wherever it could be profitably employed has been one of the great forces which have made for the increased prosperity of the human race in modern times. In the seventeenth and eighteenth centuries Great Britain supplied money for the development of the sugar, tobacco, and other plantations of the Indies and of America; but it was not until the invention of railways that the investments of British capital abroad assumed large proportions. A statement of the existing amounts of capital employed abroad by Great Britain gives practically no indication of the valuable assistance rendered by Great Britain to the Continent in the construction of railways in France, Austria, Italy, Spain and in other countries, as Continental countries have now repaid the greater portion of the sums with which Great Britain supplied them for railway construction. Nevertheless even Continental countries owe the increase in their prosperity in no small degree to the enterprise of Great Britain in building railways for them when their own supplies of capital were inadequate for the purpose.

The country which has received the largest amount of British capital is the United States, where we have been placing capital from the days of Queen Elizabeth. The War of Independence and the war of 1812–1814 caused but a temporary halt in the flow of British capital to America, but the amounts that were invested in that country prior to the days of railways were insignificant in comparison with the great sums which have been provided by investors since they began to find a large portion of the capital needed for the construction of railways in the young countries. There have, of course, been periods in which the States have been in a position to repay some of the capital obtained from this country, but these periods have been short and from decade to decade the amount of our investments in the United States has shown large expansion until at the present time it reaches the great sum of about 688,000,000*l.* It should, of course, be recognised that a part of this sum, and no inconsiderable part either, has resulted from increment or from the employment of profits by the undertakings in which the capital was placed to such good purpose, and that the value of the original sums invested has immensely increased. Of this great sum nearly 600,000,000*l.* is in railway securities. The purposes for which the investors of this country have found capital for the States are shown by the following statement:—

	United States.	Cuba.	Philippines.
	£	£	£
Government	—	2,282,000	—
Municipal	7,896,000	—	—
Railways	586,227,000	17,387,000	7,902,000
Banks	930,000	—	—
Breweries and distilleries	11,505,000	—	—
Commercial, industrial, &c.	15,715,000	1,712,000	—
Finance, land, and investment	31,437,000	182,000	—
Gas and water	1,137,000	—	—
Iron, coal, and steel	346,000	—	—
Mines	21,621,000	—	—
Motor traction and manufacturing	395,000	—	—
Oil	3,575,000	171,000	—
Rubber	—	—	50,000
Telegraphs and telephones	4,347,000	966,000	—
Tramways	2,947,000	—	250,000
Total	**688,078,000**	**22,700,000**	**8,202,000**

Inasmuch as the United States is now directly responsible for the government of the Philippines, and is indirectly responsible for the good government of Cuba, I have appended our investments in these islands.

With the exception of the United States, our greatest investments are in the daughter States of the Empire and in our great Indian possessions. Excluding the United States—to which, however, we are also attached by ties of blood and of language—Great Britain has provided more capital to Canada than to any other country, and the rate at which the British people are now increasing their investments in Canada is so rapid as to be phenomenal. The amount of visible capital our investors have placed in Canada now amounts to the great sum of 373,000,000*l.*, and new supplies of visible capital are flowing to Canada at the rate of over 30,000,000*l.* a year. Including the invisible capital, that is, the capital privately supplied for loans on mortgage, the purchase of land for the conduct of private businesses, &c., the amount is probably nearly 40,000,000*l.* a year. The amount of visible capital we have sent to Canada in the last three years has reached 100,000,000*l.* Canada still needs a large sum of money for the completion of the railways now under construction, and inasmuch as the Mother Country is proud of the great progress of her daughter, and is willing to supply her with all the capital she needs to develop her resources, it is evident that our capital investment in Canada will reach a much greater total in a few years. Practically the whole of the capital which has been spent upon railway construction in Canada has been provided by the investors of Great Britain. In the 'nineties, when our investors were suffering from a feeling of distrust of other nations, including the Colonies, the progress of Canada was very slow, and the increase in her population relatively unimportant; but in recent years the ability of Canada to obtain all the capital she needs for the development of her natural riches has stimulated the growth of her population in a wonderful manner.

The British people have provided their kinsmen in the Australasian Colonies with nearly as much capital as they have supplied to Canada, the visible amount reaching the great sum of 380,000,000*l.* Of this total, 301,500,000*l.* has been supplied to the Commonwealth, and 78,500,000*l.* to New Zealand. A few years ago the amount of capital supplied to the Australian colonies was much greater than that invested in Canada, but the rapidity with which Canada is developing, and the relatively slow progress of the Australian colonies have materially changed the situation. In the 'eighties there was a great flow of British capital to Australasia for railway construction, and population increased at a rapid rate; but in the 'nineties the country fell upon misfortune, first because British investors were not willing to find much new capital in consequence of their distrust of Colonial and foreign investments at that time, and, secondly, because Australia was visited by a series of droughts which seriously checked her progress. In recent years the credit of Australia has been fully restored, and the measures that are now being taken to increase the productive power of the country and to develop its natural resources will doubtless bring about the influx of a greatly increased amount of capital from this country, and thus stimulate the growth of population and of wealth. Last year the amount of new capital raised in London for Australasia was about 10,000,000*l*. In the statement herewith of the amount of capital invested by the British people in Australasia it will be noted that about two-thirds of it has been provided by loans to the various governments. The object of these loans was railway construction and other public works. The circumstances of Australasia were such that it was more desirable for the country to use its own credit in order to secure the necessary capital for railway construction than to leave railway extension to private enterprise. In Canada the circumstances are different, and the Canadian people have been able to get all the capital they require for railway construction by means of companies and by private enterprise; but although the methods of obtaining the capital have differed, the railways both of Canada and of Australasia have been almost entirely constructed by means of the capital supplied by the Mother Country.

The investment of the British people in South Africa is also of vast extent. The amount reaches the great sum of 351,000,000*l*. Of this total, 125,000,000*l*. is the capital of mining companies, 97,000,000*l*. loans to the various Governments of South Africa, and 73,000,000*l*. is the capital of land and investment companies. There is a certain amount of duplication in these totals, as the investment companies hold large amounts of mining shares. Although I have excluded the purely trust companies, a certain amount of duplication is unavoidable. Nevertheless the greater portion of the 73,000,000*l*. of capital which we have found for land and investment companies is not duplication, but represents the actual investments of those companies in land and property. This total includes the capital of the British South Africa Company, amounting to 8,250,000*l*. The loans to the Governments have been mainly spent on railway construction, as well as the 9,000,000*l*. of capital which we have supplied to railway companies.

The amount of visible capital we have found for our great Indian Empire is no less than 365,000,000*l*., the larger portion of which has been for the construction of railways. The capital of the railway companies is 137,000,000*l*., and the Government loans of 179,000,000*l*. have been mainly for railway purposes. The capital of tea companies provided by our investors is nearly 20,000,000*l*. No one can doubt the beneficent effect upon the prosperity of India of this expenditure of British capital for the development of the natural resources of the country, and the linking up of district with district, which has so powerfully helped to diminish the severity of famines. This great sum has been lent to India at an exceptionally low rate of interest, and having regard to the immense increase in the wealth of the Indian people which has resulted, and is resulting, from the construction of railways, the burden of the low interest charge is quite negligible. Probably the improvement in the condition of the people resulting from railway construction has been one of the most potent factors in maintaining the loyalty of the vast populations of India to the British Empire.

The investments of the British people in the minor Colonies are also of a large amount. For West Africa, where the rate of development has recently been rapid owing to the discovery of gold, the British people have found over 29,000,000*l.* of capital, of which 12,000,000*l.* has been for mines and 8,000,000*l.* for Government loans, mainly for railways. The recent development of the motor car industry in this and in other countries, which has so greatly increased the demand for rubber, has induced our investors to place considerable amounts of capital in the Straits Settlements and Federated Malay States. The total visible amount of capital we have provided for these Colonies is about 22,000,000*l.*, of which over 10,000,000*l.* is for rubber and 8,000,000*l.* for Government loans. The increase in the prosperity of our Malay Possessions, in consequence of the investment of British capital in the development of rubber plantations, has been striking. I set out in the table on page 180 the amounts of capital the British people have provided for each of the daughter States, for India and Ceylon, and for the minor Colonies.

The aggregate amount of capital which the Mother Country has provided for the British Dominions beyond the seas is the great sum of 1,554,000,000*l.* Beyond this she has found a great deal of invisible capital for mercantile and other purposes. Other nations have participated in these investments of capital in the colonies and possessions of Great Britain to only a very small extent. Probably the greatest participation has been in the mines of South Africa, but even here the total amount of shares held on the Continent is inconsiderable in comparison with the quantity held in Great Britain. If it were possible to make allowance for the holdings of other countries in British enterprises on the one hand and the amount of British capital privately placed in the colonies and in India on the other, the total would, I am convinced, be greater than 1,554,000,000*l.* Of this total we have supplied about 83,000,000*l.* in the current year, and a sum of no less than 227,000,000*l.* in the past three years. The capital invested in the Colonies alone, excluding India, is nearly 1,200,000,000*l.* To realise the magnitude of this sum it is necessary to recollect that

	Canada and Newfoundland.	Common-wealth.	New Zealand.	Total of Australasia.	South Africa.	West Africa.	India and Ceylon.	Straits Settlements and Malay States.	Miscellaneous British Possessions.
	£	£	£	£	£	£	£	£	£
Government	74,621,000	190,615,000	57,825,000	248,440,000	97,379,000	8,541,000	178,995,000	7,943,000	6,969,000
Municipal	18,327,000	7,750,000	6,896,000	14,646,000	17,701,000	—	3,522,000	—	—
Railways	223,740,000	2,951,000	761,000	3,712,000	9,354,000	—	136,519,000	—	—
Banks	4,180,000	16,784,000	2,563,000	19 347,000	4,558,000	257,000	3,400,000	—	1,717,000
Breweries and distilleries	—	725,000	—	725,000	3,065,000	—	—	—	—
Canals and docks	—	—	—	—	—	—	—	—	100,000
Commercial and industrial, &c.	14,357,000	11,900,000	400,000	12,300,000	7,024,000	1,547,000	2,647,000	—	7,112,000
Electric lighting and power	3,272,000	1,579,000	—	1,579,000	3,667,000	—	1,763,000	—	40,000
Financial, land and investment	12,613,000	21,701,000	6,256,000	27,957,000	73,363,000	5,242,000	1,853,000	1,485,000	5,255,000
Gas and water	743,000	1,997,000	250,000	2,247,000	1,339,000	—	659,000	—	245,000
Insurance	246,000	—	—	—	—	—	—	—	—
Iron, coal and steel	7,331,000	1,202,000	55,000	1,257,000	6,392,000	—	803,000	—	75,000
Mines	7,396,000	40,296,000	2,798,000	43,094,000	125,065,000	12,437,000	3,531,000	1,912,000	587,000
Motor traction and manufacturing	—	94,000	100,000	194,000	—	—	90,000	—	—
Nitrate	—	—	—	—	—	—	—	—	—
Oil	907,000	1,064,000	—	1,064,000	165,000	428,000	3,184,000	—	300,000
Rubber	—	—	—	—	495,000	1,046,000	4,610,000	10,697,000	2,843,000
Shipping	200,000	—	—	—	—	—	—	—	—
Tea and coffee	—	—	—	—	—	—	19,644,000	—	—
Telegraphs and telephones	—	—	—	—	—	—	43,000	—	7,371,000
Tramways	5,808,000	2,863,000	625,000	3,488,000	1,801,000	—	4,136,000	—	645,000
Total	**373,541,000**	**301,521,000**	**78,529,000**	**380,050,000**	**351,368,000**	**29,498,000**	**365,399,000**	**22,037,000**	**33,259,000**

the populations of the Colonies where this great amount is invested are relatively small. To Canada, Australasia, and South Africa, which possess a combined population of about 20,000,000 persons, Great Britain has supplied 1,100,000,000*l.* of capital. In so far as the prosperity of the British Empire is governed by the amount of capital which the mother country is able to supply to the colonies and to India, its future expansion in population and in prosperity is assured. Never has Great Britain had so much new capital available for investment in the colonies and in India, and never has she supplied money so freely to the other nations of the Empire as she has done in the past few years. The rapid progress of Canada, the recovery in Australia, the improvement in South Africa and the prosperity of India at the present time clearly show how potent are the influences upon the progress and development of the Empire of the large amounts of capital with which the British people are now so freely supplying to those lands.

Outside the British Empire and the United States our investments are largely confined to the young nations of America. It is true that during the Russo-Japanese War we did supply a large amount of capital to Japan, but this was an exceptional transaction, and it is probable that in twenty or thirty years Japan will repay the whole of the large sum of money borrowed for war purposes. We also have a fairly substantial investment in China, and probably the amount of our investment in China will show rapid expansion now that the Chinese people are awakening to the advantages of modern civilisation and modern science, are educating themselves on the Western plan and are favourable to the construction of a great system of railways to open up their vast country. Of the young countries not connected with Great Britain by ties of empire or of race, we have supplied the largest amount of capital to Argentina. In that fertile and progressive State we have embarked no less than 269,000,000*l.* of capital, of which by far the greater portion has been for railway and tramway construction. The capital of British companies owning railways in Argentina amounts to the great sum of 186,000,000*l.* and the capital in the tramways owned by British companies is nearly 19,000,000*l.* The extension of railways in Argentina has recently been rapid and the greater portion of the necessary capital has been supplied from London. In the last three years as much as 56,000,000*l.* of capital has been subscribed by British investors for Argentina, of which 16,500,000*l.* has been provided in the current year. Our next greatest investment is in Mexico, to whom we have supplied 87,000,000*l.* of capital, about 62 per cent. of which has been for railway purposes and over 7,000,000*l.* for the development of the mineral wealth of the

	Argentina.	Mexico.	Brazil.	Chili.	Uruguay.	Peru.	Miscellaneous American countries.
	£	£	£	£	£	£	£
Government	33,768,000	6,653,000	28,938,000	16,962,000	8,779,000	80,600	3,838,000
Municipal	4,571,000	1,623,900	11,283,000	109,000	1,081,000	—	—
Railways	186,126,000	54,306,000	29,961,000	12,646,000	21,194,000	6,476,000	11,681,000
Banks	1,850,000	1,576,000	1,000,000	1,250,000	—	—	—
Breweries and distilleries	993,000	—	—	—	—	254,000	—
Canals and docks	1,941,000	—	800,000	—	—	—	—
Commercial and industrial, &c.	6,922,000	1,875,000	4,403,000	953,000	1,562,000	321,000	250,000
Electric lighting and power	889,000	937,000	—	—	—	1,164,000	309,000
Financial, land, and investment	8,060,000	7,416,000	3,542,000	225,000	116,000	22,139,000	303,000
Gas and water	3,854,000	—	639,000	400,000	1,078,000	—	100,000
Mines	832,000	7,440,000	1,560,000	721,000	—	711,000	4,445,000
Nitrate	—	—	—	11,264,000	—	—	—
Oil	—	998,000	—	—	—	335,000	300,000
Rubber	—	1,683,000	1,318,000	—	—	506,000	622,000
Tea and coffee	—	—	1,584,000	—	—	—	113,000
Telegraphs and telephones	1,390,000	—	550,000	220,000	159,000	—	—
Tramways	18,612,000	2,827,000	8,862,000	1,625,000	1,286,000	—	556,000
Total	**269,808,000**	**87,334,900**	**94,440,000**	**46,375,000**	**35,255,000**	**31,986,600**	**22,517,000**

country. To Brazil our investors have lent as much as 94,000,000*l.*, also mainly for railways and public works. To Chili we have sent 46,000,000*l.*, largely for railways, but inasmuch as Chili possesses rich deposits of nitrate we have found 11,000,000*l.* of capital for the production of this valuable fertiliser. In Uruguay our investments reach 35.000,000*l.* mainly in railways. In Peru we have 32,000,000*l.*, chiefly in railways. It will be recollected that the chief asset of the Peruvian Corporation is its railway system

To other South and Central American countries we have supplied 23,000,000*l.* of capital mainly for railways and for mining. The extent of our visible investments of capital in the American countries, exclusive of Canada and the United States, are set out in the table on page 182.

I have already referred to our investments in Japan and China. The sum in Japan amounts to about 54,000,000*l.*, of which 36,000,000*l.* was supplied to the Government for war purposes, 7,000,000*l.* to municipalities, and nearly 9,000,000*l.* to railway companies. I would point out that the amount of Japanese Government loans held in this country is ascertained from the particulars of the amount of interest on the loans assessed to Income Tax as supplied to the Inland Revenue Commissioners. We hold a considerable amount of Japanese Internal Debt, of which the interest is payable in Japan, and of which consequently there is no record. It is probable that the total amount of Japanese Debt held in this country appreciably exceeds 36,000,000*l.* The visible amounts of capital we have supplied to Japan and China are as follows:—

	Japan.	China.	Miscellaneous foreign countries.
	£	£	£
Government	35,941,000	22,477,000	818,000
Municipal	6,843,000	—	—
Railways	8,910,000	—	4,521,000
Banks	1,299,000	—	2,759,000
Commercial, industrial, &c.	32,000	1,401,000	4,805,000
Electric lighting and power	—	9,000	80,000
Financial, land and investment	202,000	1,879,000	5,489,000
Gas and water	478,000	373,000	5,414.000
Iron, coal and steel	—	—	60,000
Mines	—	350,000	2,582,000
Oil	—	—	3,326,000
Rubber	—	—	8,669,000
Tea and coffee	—	—	25,000
Telegraphs and telephones	—	—	23,359,000
Tramways	—	320,000	—
Total	**53,705,000**	**26,809,000**	**61,907,000**

	Russia.	Turkey.	Egypt.	Spain.	Italy.	Portugal.	France.	Germany.	Other European Countries.
	£	£	£	£	£	£	£	£	£
Government	16,033,000	8,650,000	13,539,000	1,885,000	4,164,000	1,336,000	—	1,351,000	14,751,000
Municipal	3,076,000	1,000,000	505,000	—	—	—	—	—	8,119,000
Railways	2,013,000	6,146,000	1,916,000	5,473,000	3,284,000	4,432,000	—	—	495,000
Banks	—	2,000,000	14,413,000	—	10,000	—	—	—	299,000
Breweries and distilleries	—	—	—	—	—	—	—	564,000	564,000
Canals and docks	—	—	3,529,000	—	—	—	—	—	51,000
Commercial, industrial, &c.	—	75,000	2,091,000	180,000	997,000	203,000	5,669,000	3,489,000	5,081,000
Electric lighting and power	—	—	—	486,000	—	—	—	—	—
Financial, land and investment	946,000	93,000	5,796,000	107,000	12,000	100,000	158,000	175,000	390,000
Gas and water	130,000	91,000	1,216,000	490,000	1,622,000	37,000	840,000	—	1,401,000
Iron, coal and steel	2,813,000	—	—	952,000	—	—	—	—	100,000
Mines	5,265,000	223,000	508,000	9,076,000	1,258,000	486,000	404,000	482,000	2,353,000
Motor traction and manufacturing	—	—	—	—	—	—	—	—	210,000
Nitrate	—	—	—	—	—	—	—	—	—
Oil	8,112,000	40,000	14,000	55,000	—	20,000	—	—	1,745,000
Rubber	—	—	—	104,000	—	—	—	—	—
Telegraphs and telephones	—	—	226,000	—	—	—	—	—	—
Tramways	—	28,000	—	—	166,000	1,520,000	—	—	760,000
Total	**38,388,000**	**18,320,000**	**43,753,000**	**18,808,000**	**11,513,000**	**8,134,000**	**7,071,000**	**6,061,000**	**36,319,000**

In Europe our greatest investment is in Russia, where the amount placed is 38,000,000*l.*, of which 8,000,000*l.* represents the capital of Russian oil companies, 5,000,000*l.* the capital of mining companies, and 16,000,000*l.* Government loans. The Government debt owned here has been raised for railway construction. In Turkey our investments total 18,000,000*l.*, of which nearly 9,000,000*l.* are loans to the Government and 6,000,000*l.* are the capital of railways owned by British companies. Inasmuch as Egypt is a portion of the Turkish Empire, I include Egypt in the same statement as Turkey. We have found about 44,000,000*l.* of capital for Egypt, of which 14,000,000*l*, is in banking companies, over 14,000,000*l.* is in loans to the Government, nearly 6,000,000*l.* is the capital of land and investment companies, and 3,529,000*l.* is the nominal value of the Suez Canal shares held by the British Government. The market value of the Suez Canal shares is now 38,000,000*l.* Our investments in Spain total 19,000,000*l.*, of which 9,000,000*l.* is in mining companies and 5,000,000*l.* in railways. In Italy the aggregate is 11,500,000*l.*, mainly in Government loans and railways. To Portugal we have supplied 8,000,000*l.*, chiefly for railways. In France, Germany, and in other European countries, our investments are of very small amount, although in the aggregate they reach the substantial sum of nearly 50,000,000*l.* The extent of our investments in the more important borrowing countries of Europe and in Egypt, as well as in France and Germany, is shown in the statement given on page 184.

The aggregate of our investments in foreign countries is 1,638,000,000*l.*, of which 42 per cent. is in the United States. Over 60 per cent. of our foreign investments has been employed in the construction of railways, either directly by British companies, or indirectly by means of the loans with which we have provided the Governments of the various countries. Most of the remaining 40 per cent. has been directly employed in developing the world's supplies of natural wealth. It will, of course, be realised that railways are the instrument mainly needed to develop the natural agricultural wealth of the young countries, and that if the capital provided for railway construction be regarded as a part of the total capital we have found for developing the riches which nature has bestowed upon the world, it is evident that almost the whole of the capital provided by Great Britain for other countries has been used for increasing the world's productions of food, minerals, lumber, oil, nitrate, rubber and other natural products. To show the amounts of capital we have supplied to the various countries of the world I give the following statement:—

The Colonies and India.

	£
North America—	
Canada and Newfoundland	372,541,000
Australasia—	
Australian Commonwealth	301,521,000
New Zealand	78,529,000
Africa—	
South Africa	351,368,000
West Africa	29,498,000
Asia—	
India and Ceylon	365,399,000
Straits Settlements	22,037,000
Hong Kong	3.104,000
British North Borneo	5,131,000
Other British Possessions	25,024,000
Total British Colonies and India	**1,554,152,000**

Foreign countries.

United States	688,078,000
Cuba	22,700,000
Philippines	8,202,000
Argentina	269,808,000
Mexico	87,334,000
Brazil	94,440,000
Chili	46,375,000
Uruguay	35,255,000
Peru	31,986,000
Miscellaneous American countries	22,517,000
Russia	38,388,000
Turkey	18,320,000
Egypt	43.753,000
Spain	18,808,000
Italy	11,513,000
Portugal	8,134,000
France	7,071,000
Germany	6,061,000
Miscellaneous European countries	36,319,000
Japan	53,705,000
China	26,809,000
Miscellaneous foreign countries	61,907,000
Total Foreign countries	**1,637,684,000**
Grand total, all countries	**3,191,836,000**

Of our total Colonial and foreign investments 53 per cent. is in the Americas, 16 per cent. is in Asia, 14 per cent. is in Africa, 12 per cent. is in Australasia, and 5 per cent. is in Europe. The geographical distribution of our investments over the various continents is shown by the following statement :—

	£	Per cent. of total.
Americas	1,700,000,000	53
Asia	500,000,000	16
Africa	455,000,000	14
Australasia	387,000,000	12
Europe	150,000,000	5
Total	**3,192,000,000**	**100**

In conclusion, I would ask you to note that this great sum of 3,192,000,000*l.* of capital which Great Britain has supplied to the nations, is not the total sum her people are employing in other lands. I have taken no account of the great sum of what is termed private capital employed abroad by the British people in a variety of ways, such as the purchase of land, loans on mortgage, deposits in banks, branch manufacturing, mercantile, and trade undertakings, &c., &c. If allowance be made, on the one hand, for the foreign capital employed in British companies both at home and abroad and in British loans, and, on the other, for the vast amount of private capital which the British people have placed abroad, I think the net total of our investments in other lands would be not much short of 3,500,000,000*l.* But inasmuch as the amount of the private capital employed abroad cannot be ascertained I have ignored it, and have confined myself to that portion of our capital investments in other lands for which there is documentary evidence.

DISCUSSION *on* MR. PAISH'S PAPER.

SIR RICHARD MARTIN, in proposing a vote of thanks to the author, said he had not had the Paper long enough in his hands to be able to examine it with the detail it deserved, for it was full of interesting matter. He did not quite understand whether Mr. Paish in his totals had eliminated loans granted in order to repay securities issued at a higher rate of interest. It often happened, in America especially, as well as in Japan, that money was borrowed at, say, 5 per cent., but, as the credit of the borrowers improved, they were able to borrow at, say, 4 per cent., and they did so in order to repay the previous loan. That would, of course, make a certain amount of difference. He concluded that the net sum realised was taken, and not the nominal amount of capital, for the reason that in some instances, especially a few years ago, this would show a very considerable difference. In speaking of America, Mr. Paish had said nothing about the defaulting States, and he did not know whether he had taken them into account. He must, however, be aware that certain States had absolutely repudiated their engagements, *e.g.*, Louisiana, Mississippi, West Virginia, and other States which were almost hopelessly and fraudulently bankrupt. Costa Rica and Guatemala had also repudiated. These repudiations amounted in all to about 15,000,000*l.*, and they had to be considered. Mr. Paish was quite right in saying that a very large amount of undisclosed capital was advanced, especially in Canada; and it was surprising to find the amount of money which went out of this country to support farmers and traders. This was a very healthy sign at a time when people were taken in by prospectuses and would not advance to private people unless they were thoroughly established and likely to succeed. He looked upon the money that went out of the country privately as representing some of the best investments made by the British public. One or two points were not quite clear. Did "Colonial and foreign municipal stocks" in the first table include Colonial municipal stocks or only foreign municipal and Colonial and provincial Government stocks? Just above, there was the heading "Colonial and provincial Government loans"; did that refer to the provincial Governments of the Colonies or only the provincial Governments of other countries not included in the Colonies? In the list on page 170, Algeria, Bulgaria, and several States were included; yet only a small proportion of the advances made to the South-eastern States of Europe came from this country; and, as they were nearly all contracted in Paris or Berlin, some of the loans, if held here at the beginning, very rapidly went abroad. He supposed that the total at which Mr. Paish had arrived might be considered to be absolutely up-to-date, and included loans running from remote times. He must confess that he thought the figures came out at an amazing total, and were higher perhaps than those not fully acquainted with the subject would have guessed. He would have liked to have had the opportunity of analysing one or two of the tables; and he suggested to Mr. Paish that he should, in one or two instances, give full details to show exactly how they were produced. That would be both valuable and interesting.

Mr. Paish said he would at once explain how these tables were compiled. As regards the new subscriptions in the last three years all conversions were carefully excluded, so that there was no duplication of capital issued; secondly, the new securities were taken at the price of issue; and, thirdly, vendors' shares were omitted in order to arrive as nearly as possible at the exact amount of money subscribed in the aggregate. Then, as regards the net sum subscribed by British investors, he had taken credit for only those portions of international loans, including American Railway issues, that had been subscribed for in this country. "Colonial provincial" meant loans for Colonial provinces such as Saskatchewan. With regard to the other particulars of the capital provided by our investors up to the end of 1907, they were arrived at by capitalising the income which actually paid income tax to the British Exchequer and by examination of the reports of British companies trading abroad. No credit had been taken for money lent to defaulting States, as in these instances there was of course no income tax paid in respect of coupons. If no coupons were cashed there was no capital against them. The capital sum invested in foreign loans was arrived at by capitalising the coupons that had been encashed. The return of the Inland Revenue Commissioners showed the amount of income received each year as interest from the various Governments; and, having got that, and having ascertained the credit of the Governments, he had capitalised the interest at the years purchase indicated by the interest on the bonds. So far as possible, he had excluded everything which ought to be excluded.

Mr. A. W. FLUX said he rose with great pleasure to second the vote of thanks. Everyone who had attempted to make calculations on this line must be aware of the difficulties the author had had to face, and had faced so well. The amount of instruction contained in such statistics as he had placed before them could hardly be realised on a first hearing. As had been said, they required more close study and more minute analysis than it was possible to give on such an occasion as the reading of the Paper. It struck him as a little remarkable to find, in comparing the totals which Mr. Paish gave when he read his last Paper with those given that day, divided between two great groups—the British Empire outside the United Kingdom and foreign countries—that the rate of increase of capital did not substantially differ in those two groups. He confessed to being a little surprised to find that the British Empire was not attracting an amount of new investments larger relatively to the previously existing aggregate. Comparing the figures of the first page with the summary of the totals on the last page, one found that to the 1,312,000,000*l.* invested in the British Empire three years ago there had been added 242,000,000*l.*; and to the 1,381,000,000*l.* invested in foreign countries there had been added 256,000,000*l.* The relative rate of progress was thus nearly the same. It might be that having regard to the undisclosed investments, to which reference had been made, and which constituted so serious a difficulty in making any satisfactory estimate of the total invested abroad, the unexpected nature of this conclusion might be modified a little. As to how far this was the case Mr. Paish might have formed some opinion, though he would perhaps not care to express it; but, if he did, it would be distinctly interesting. On another point he was inclined to echo the words of Sir Richard Martin, and to ask for a little more light. When one compared the new figures with the old to see what aggregate changes were indicated in different directions, the summaries which Mr. Paish had made enabled one to attempt to grasp the general significance of the Paper. If one compared the total for foreign Government loans on the first page with those shown later, grouped together, there appeared to be a difference not fully accounted for by the new investments, after making allowance for foreign participations. He would be grateful for any further explanation on that point. In view of the impossibility of analysing at short notice such a mass of material, he was tempted to give expression to one little speculation which was suggested by certain remarks in the Paper. The author pointed out that investments formerly made in European countries had been, to a large extent, redeemed as those countries had grown in wealth, in industry, and in capacity to provide for themselves the capital needed for their development. One was tempted to cast one's thoughts forward, and to wonder to what extent that same process might develop in other parts of the world, and in what kind of position our great-grandchildren might find themselves when the growth of civilisation and the development of industry in those countries which, up to the present time, had had to depend on Great Britain, France, Germany and other great capital-owning nations for the funds with which to carry on their development, had brought them to that stage of progress at which they would be able to pay off the greater part of the amounts which they had borrowed at an earlier stage. Then it would appear that the great capital-owning nations must either consume their capital unprofitably or develop within their own territories new means to find a placement for these great sums of capital. One might, of course, imagine that there were revolutionary changes ahead, but one hardly liked to make very definite the thoughts which presented themselves; while to throw out a vague suggestion was almost more unprofitable than to leave it alone. He hoped he would be pardoned for this suggestion, which arose out of some of the reflections to which Mr. Paish had given expression, and which somewhat tempted those who were speculatively inclined.

Mr. ALFRED AKERS said he must associate himself with what previous speakers had said as to the value of the Paper and the great amount of labour obviously involved in its preparation. If he might venture to offer one criticism he would suggest that although these figures dealing with the visible foreign investments might be of extreme value, the private capital employed abroad and in the Colonies could not be ascertained; and, as Mr. Paish's tables were drawn up, he understood, from figures supplied by prospectuses of companies and Government loans, one was liable to fall into grave error as to what the whole amount of capital invested abroad might be, on the ground that private capital was ignored. In the last paragraph, although Mr. Paish said that the amount of private capital could not be ascertained, he had ventured to assume that the total amount of investments abroad, including private capital, would not be much short of 3,500,000,000*l*. Now, as the ascertained visible capital abroad, according to Mr. Paish's calculations, amounted to 3,192,000,000*l*., that left a sum of 308,000,000*l*. estimated for private capital; and when one considered that this unknown private capital included a great amount found here for the purchase of land, &c., abroad, especially in Canada, not by companies but by private persons, and the large amount invested abroad by companies ostensibly working in England, whose capital was not necessarily known to be employed abroad, he asked whether

Mr. Paish could give any ground whatever for his assumption of the probable amount of invisible capital sent abroad. He might be quite right in his view that the sum privately subscribed for foreign investment was only about 308,000,000*l.*, or one-tenth of the sum which he found was known to have been publicly subscribed. He must, however, have had some reason for arriving at that figure; and if he could explain why he thought that relatively small sum was sufficient, it would be helpful. One might well surmise, he thought, that a sum similar to that subscribed openly might possibly be invested privately. Could Mr. Paish set out grounds for fixing, within limits, the amount likely to have been privately subscribed? Failing that, they were so much in the dark that they might fall into serious error in drawing deductions from the Paper.

Mr. W. R. LAWSON said the greatest compliment they could pay Mr. Paish was to recognise the fact that he had undertaken a great work, and that, so far as he had gone, he had done it with very great ability and success. At the same time, they must recognise that this work was far from being completed. As Sir Richard Martin had pointed out, much more analysis was required, and also more deduction as well as addition. After that had been done, the most important part of all had to come, namely, to find out the actual economic significance and value of these huge figures. So far, the author did not pretend to have tackled that part of the problem. He had thrown out suggestions here and there which indicated clearly enough his own opinions on the subject, but he had come to no precise scientific conclusions with regard to the meaning of these figures. For instance, the title of the paper might be objected to. With all respect for Mr. Paish, he thought the term "capital investments" was misleading and inapplicable, and that the proper term would be "financial operations." Mr. Paish was naturally aware that in every one of these transactions there was a great deal of finance; generally, there was quite as much credit as actual cash. Consequently, it was a misnomer to speak about "capital investments," and a still worse misnomer to speak of these so-called "investments" as being entirely savings. They were not wholly savings, perhaps not even the major part of them. Everything was a mixture of financial operations. He did not think Mr. Paish had made anything like sufficient allowance for what he might call the decay of our foreign investments—not merely by depreciation or actual loss, but by passing into other hands. To give an illustration of that, in connection with our foreign and Colonial railway investments, we had been the largest railway builders in the world. If anybody could challenge us on that point it was the Americans, but their railway building was confined to their own country, whereas we had built railways all over the world, and we had financed them. But we were not by any means the greatest railway owners at the present day; for thousands of miles of the railways which were built in the early days—by Brassey, for instance—had entirely passed out of our hands. Brassey built nearly the whole of the Roumanian railways; but now we did not own a mile of them.

Again, in the case of Germany, when he first knew the late Mr. Staats-Forbes, he was Chairman of several important railway companies in Rhenish Germany; but those had been all taken back by the Germans. Nearly all our Brazilian railways had been taken back by the Government. If we were going to have an exact estimate of our investments in foreign and Colonial railways we should have to make very large allowance for investments which had passed out of our hands, though in one form or another they still figured among our foreign investments. Turning to Canada, the undertaking of the Canadian Pacific Railway, when it had a stock capital of about $65,000,000, was very largely owned in this country; but now that its capital was $200,000,000 we held a comparatively small portion of it. If we imagined we possessed $200,000,000 of the Canadian Pacific capital we should be making a great mistake. Then, taking as an opposite example the Grand Trunk Railway, we put into that railway many millions of hard cash; but the hard cash had in the course of time dwindled down to a small part of what our people put into it. As he understood, the author made no deduction for that kind of loss, the wear and tear of investments. On the other hand, he made no allowance for the immense appreciation in some classes of foreign investments. Taking the rubber group as an example, he valued that at 10,000,000*l.* sterling; but most of the rubber shares stood at high premiums, some of them at 2,000 or 3,000 per cent. It would take years of labour to arrive at a really correct figure on this subject. Without presuming to say that Mr. Paish's figures were wrong, he would simply point out that they were not and could not possibly be scientific figures. His chief exception to them was that they seemed to favour the curious fallacy that our capital abroad was always going and coming—going out in the shape of exports and coming back in the shape of imports. The bulk of it does not come back at all, nor even the bulk of the interest. Both capital and interest accumulate abroad, and are moved from one country to another without ever coming home. In order to refute the savings fallacy he had made out a list of the new issues made during the eleven years beginning with 1900. The total was 1,548,000,000*l.*; but if they concluded from that that they had actually saved 1,548,000,000*l.*, and put it into foreign investments, they would be living in a fool's paradise. A great part of those investments had gone into other hands, a good deal was lost, and much of it had been financed without money either going out or coming in. He hoped Mr. Paish would appreciate the friendly nature of the criticism he had ventured to make. He was simply endeavouring to point out some of the work still requiring to be done. It would be presumption for him to find fault with work which was a speciality of Mr. Paish, and unique of its kind. He was only suggesting points for further elucidation.

Mr. T. A. WELTON said he would like to ask Mr. Paish, with regard to the mines in South Africa, which he had put down at 150,000,000*l.*, whether that was a representation of the capitalised dividends, or whether it represented the total amount of mining capital in that part of the world; and, if the total amount issued was much greater than that, it would be of interest to know how he had got rid of the odd millions. With regard to private capital, no doubt in former years a very great deal of the business of America and also of Russia was done with English capital provided in enormous quantities. Factors who collected produce in Russia were provided with money from England. Some years ago an individual factor failed for about 200,000*l.*, nearly all of which was due to English people. As far as the United States went, he believed the position of things was altogether altered, and that the Americans were now better able to provide us with money than we were able to supply them. At the same time, no doubt, an enormous amount of English capital which could not by any possibility come within the four corners of the Paper was used for carrying on the commerce of other countries.

Mr. HENRY BEAUMONT said that, as a visitor, he wished to express how deeply grateful he felt to Mr. Paish for his very useful Paper on a subject which was paramount in the minds of many people to-day, and was often used, he was sorry to say, for very unworthy purposes. But they should dismiss all that from their minds in looking at this subject. He thought the totals arrived at were quite within the mark, but he did not agree with the totals given for the last three years. He could not bring himself to realise that in three years we had subscribed as much as 450,000,000*l.* of new capital to foreign countries and our Colonies, and he did not think sufficient allowance had been made for the large participation of foreign houses in a great many of these issues. It was very rare nowadays to get entirely to ourselves a loan of any importance; a large portion was always reserved for some foreign countries, and he did not think sufficient allowance had been made for the enormous transfer of securities from London to other European countries. For instance, there had been an enormous shifting of Mexican securities from London to other great centres in Europe. Apart from this, he thought the figures were substantially accurate; but there were two points to which he would like to invite attention. On page 181 Mr. Paish said "Never has Great Britain had so much new available capital for investment in the Colonies and in India, and never has she supplied money so freely to the other nations of the Empire as she has done in the past few years." There was a great reason for that. The total amount of foreign and Colonial investments in the last five years came to very nearly the amount of interest due from those countries, so that practically we had sent out little fresh capital. What it came to was that we had simply left in our debtor countries the amount of money due to us for interest on the moneys invested, so that fresh capital had not been found to the extent people thought. That had an important bearing on several questions. We had passed the pioneer days, and had arrived at a state of things with regard to foreign and Colonial investments which we had never touched before. We were lending every year about the amount, taking the average of five years, which was due to us from those countries. He did not think we could make better investments, as we were simply providing money for the extension of railways and other undertakings. Mr. Lawson had said something about the great economic questions underlying this Paper, to which the author had not referred, and he would refer to one of them. Something had been said about the small amount of capital which had gone to Australia; our large insurance companies had had to withdraw capital from there. Four or five years ago those companies had millions of money invested in that Continent, but they were no longer able to employ it there, for the simple reason that there was sufficient money in Australia to supply the demand at the present time and there was no room for any large outlay of new capital. The greater part of our money had gone in the construction of railways—in Australia, about 100,000,000*l.*; in Canada, about 150,000,000*l.*; in Argentina, about 170,000,000*l.*; and in India, about 150,000,000*l.* The position then was that we had lent money to Australia at a low rate of interest; she had made her railways, and she had made them at a very considerable profit—as much, taking it altogether, as half to threequarters per cent. on a total of over 100,000,000*l.* All the interest we had in that was to supply Australia with locomotives, for which, he believed, she was our best customer. The case of Canada was totally different. We had supplied 150,000,000*l.* to 160,000,000*l.*, and that investment was in most cases returning us a considerable rate of interest—in the case of the Canadian Pacific a very high rate—and therefore one could look on them, as a whole, as very profitable. But from the point of view of trade our interest ceased; we sold nothing to Canada—we did not supply even steel rails or locomotives. In Argentina there were from 16,000 to 18,000 miles of railway, all built by British firms. We had supplied them with 170,000,000*l.* of capital, 70,000,000*l.* of which brought in 7 per cent. interest and the rest a very high rate. There had been an enormous stimulus to the industries of this country, since we supplied the whole of those railways with rails, locomotives, cars, and all the necessary material. These large investments were therefore of considerable importance to this country. In the case of India we reaped a benefit all round. Next to Australia, India was the largest customer we had had for locomotives; we had supplied all the material and all the equipment, and built the railways, and we reaped the profit very largely. All those things pointed to the fact that under our present system capital flowed in the directions where it was wanted and where it could be most remuneratively employed, and that showed that our system was right. That point seemed of considerable importance, and one which should be borne in mind. Another point not mentioned in the Paper was the creation of enormous trusts. Every boom was followed by the creation of a trust, and in that form all the premier securities became exceedingly safe. We had, perhaps, 100,000,000*l.* of money invested all over the world in companies which the ordinary investor would never think of touching, and these trusts had been the means of creating an enormous amount of securities which might be considered of a premier character, and which had very largely come into competition with our own securities.

Sir EDGAR SPEYER expressed his great pleasure at listening to so interesting and important a Paper, and his admiration for the thoroughness with which the author had prepared it. He had carefully listened to the criticisms which had been offered, but he had not heard anything which invalidated the conclusions at which the author had arrived; in fact, he thought the figures given were compiled in the most careful and conservative way. Mr. Lawson had suggested that the author had not taken into account depreciation and waste, but that was, in his opinion, more than balanced by the great appreciation. On the whole, he thought the depreciation was insignificant compared with the appreciation of the investments of this country. Mr. Beaumont had brought in a good many points which seemed to go rather beyond the scope of the Paper. The author had not dealt with the economic aspect of this matter; he was simply concerned in proving what the investments were. There were a variety of magnificent results which sprang from those investments, but to deal with these results was not the nature of the Paper. He had some doubt as to whether the average rate of interest at which Mr. Paish had arrived was not a little misleading; because he thought account should be taken of the amortisation of capital. Had Mr. Paish done this? The average of 5·2 per cent. would include revenue from diamond and other mining companies *given* at 30 per cent. That might be the income to-day; but amongst investments of that character a great deal of amortisation should be allowed, and it did not seem quite fair to take such a high yield and then to conclude that the average yield was 5 per cent.

Mr. J. M. KEYNES suggested that the Paper should more properly have been entitled "Estimated Amount of Capital Subscribed in London" rather than "Estimated Foreign Investments." If they were to take it as an estimate of foreign investments, it was subject to two opposing errors, both large and both of an unknown amount; but because the errors were in opposite directions it did not follow that the estimate could be regarded as a good estimate of foreign investments proper. On the one hand, the author made no pretence of including the amount invested otherwise than by subscription in London; on the other, he could not allow fully for the capital originally subscribed in London but which had found its way abroad subsequently; and several speakers had shown that both these errors were likely to be large. They were not justified in assuming that because these two errors were in opposite directions, they therefore cancelled out. Mr. Paish had given them extremely valuable material towards making an estimate, and had calculated the most important single item which must be taken into account in estimating the amount of capital invested abroad, but he (the speaker) did not think it ought to be regarded as supplying even a temporary estimate of foreign investments proper. It had been pointed out that when Mr. Paish moved from his original estimate to his final estimate of 3,500,000,000*l*., the addition of 300,000,000*l*. odd was perfectly arbitrary, and that no adequate reason for that had been given. He would like to ask the author whether there was any detailed evidence to support the statement that the total amount of shares held on the Continent in certain companies was inconsiderable. A good many statements made that evening had seemed to controvert it, and had suggested that the amount might be very large. He was astonished that we should have now anything like 600,000,000*l*. in American railways; but he was not in the least astonished that that amount had been subscribed originally. Again, it would be extremely useful if, in a later investigation, the author would separate Ceylon from India. In investigations concerning Indian currency and the level of prices it would be useful to have some sort of estimate of the capital invested in India; but, so long as Ceylon was included in India, the value for these purposes of Mr. Paish's calculations was much diminished. There would probably be no difficulty in separating them, as for different parts of Australasia that division had been made.

The PRESIDENT said that, before putting the vote of thanks, he might be permitted to express his personal appreciation of the Paper. What seemed to him to be perhaps the pleasantest feature of it was that when one analysed the purposes to which this enormous amount of capital was applied, one found that in almost every case it was for reproductive and beneficent purposes. It seemed to be one of the great changes which had taken place during the last forty years that Governments, when they applied for a loan of capital, had changed the application of the capital so obtained. When he was first in the House of Commons, some forty years back, in the days of austere finance, any Government that borrowed was looked upon somewhat askance, and it was assumed that the loan was required for the purpose of balancing the deficiency between the expenditure and the revenue, or for the purpose of increasing armaments or the warlike establishments of the borrowing country. This change had, in one sense, given foreign Governments a better position in the borrowing market than they had before. Assuming that the figures on page 168 were correct, the total amount of British capital invested in foreign Government loans was estimated at 167,000,000*l*.; and on page 169 there was an estimate of the amount of capital supplied to foreign countries during the last three years which amounted to no less than 54,000,000*l*. Assuming those two sets of figures to be correct, they got the astonishing fact that the British capital supplied during the last three years was equivalent to one-third of the total capital supplied during all previous years. If that was so it must be because the investor felt that he had now not only the benefit of the security of the borrower, but also the satisfaction of knowing that the money supplied would be put to a good purpose. He recollected that many years ago the Indian Government was supposed to be in a very bad way because it was constantly borrowing, but the whole of the sums so borrowed were applied to public works and railroads; and he believed the result of that policy of judicious borrowing was that the Indian Government had now as good or a better balance-sheet than any Government in the world—their assets more than covered their liabilities. Perhaps that was wandering a little from the subject, but he thought that if one wanted to test the solvency or the credit of a foreign Government one ought to take the amount of its indebtedness by itself, divide it, and see what was the total amount chargeable on its revenues, and the dead weight of expenditure in order to meet the sums borrowed. If one did that one often found there was a very wide discrepancy between the total amount of indebtedness of a country and the actual amount of dead weight which it imposed on its revenue. Mr. Paish's Paper had passed through criticism most successfully. No doubt there must be a number of difficulties in getting an absolutely accurate actuarial calculation of our foreign investments. He thought it was impossible, but Mr. Paish had placed before them a clear view of the situation, and they were much indebted to him for having taken so much trouble and for having dealt so satisfactorily with perhaps one of the most important subjects which could occupy their attention.

Mr. PAISH, in returning thanks, said he thought he could answer almost every point which had been raised. He would first refer to Mr. Flux's remarks, and make an explanation with regard to foreign Government loans. In his previous Paper, in order not to overstate the amount of capital placed abroad, he had calculated our investments in Government bonds on the basis of the market prices of those bonds which paid interest. With regard to everything else but Government loans, he was obliged to take the nominal amount of capital. When he got the balance sheet, he had to take the capital raised by the company. Whether the market value of that capital had fallen in value or risen in value was immaterial; the documentary evidence was the figure contained in the balance sheet. In the aggregate, he believed that the market value of the companies' capitals was largely in excess of the sum subscribed. Indeed, it would be found that on the whole this country derived a large income from the increment in the value of securities. To take American railways as an example, about eleven years ago Atchison shares stood at 18, to-day they were at over par. Many people bought them at the low price. He also remembered that only a few years ago the shares of the United Steel Corporation stood at under 30, and many people bought at this price, and to-day they were between 70 and 80. As to foreign Government loans, one was in this position—one either had to take the market prices all round, and get away from the principle one applied to all the miscellaneous companies, or else to take the nominal amounts all round as shown by the balance sheets and the amounts of the outstanding loans. He had, therefore, taken the nominal amount of the loans of those Governments which paid interest, and had excluded the loans of Governments upon which no interest was received. That accounted for the difference of about 25,000,000*l*. between the two figures. With regard to private foreign capital, it was very difficult to make any estimate of the amount. With regard to gold mines, they had great houses here which knew where the shares were held. He had the good fortune of ascertaining, through a mutual friend, from the chairman of one of the greatest houses, what proportion of the South African gold mining shares were held on the Continent and in London, and he was surprised at the relative smallness of the percentage held on the Continent. He could not give the figure, because it had been told him in confidence; but it was comparatively small. He had made as thorough an inquiry as he could. Sir Edgar Speyer was good enough to give him the actual amount of capital put by our investors into the National Railways of Mexico, and it came to 23,000,000*l*. Last year, when he was in Canada, he had been informed by Sir Thomas Shaughnessy, the President of the Canadian Pacific Railway, that the English people held practically all the debentures, all the preference stock, and about 65 per cent. of the common stock of that great company. With regard to the depreciation and ebbing away of capital in foreign loans, he had entirely excluded all foreign loan capital upon which we were not now receiving interest. The income-tax returns showed the amount of interest which paid income tax. People would not pay income tax unless they received income, and as foreigners could not now get income tax back again, they might rest assured that the Government loans on which income tax was paid was British capital. In recent years that ebbing away of foreign Government loans, which was not an unusual feature a few years ago, had stopped. It was not correct to say that he had taken the new issues in London. He had taken the capital income received on our foreign investments as far as the Inland Revenue Commissioners took it out, and that figure applied to Government loans, and municipal and railway stocks and bonds; with regard to the remainder, the miscellaneous companies, he had taken only English reports, excluding all foreign reports. That was an actual figure as nearly as it could be arrived at, as far as the visible capital was concerned. It was only with regard to the last three years that he had to take new issues. It was obvious that it would have been quite impossible to go through the reports for the two years later than those of 1907; the work of going through between 3,000 and 4,000 companies' reports was enormous, and therefore he had to take the new issues of capital as indicating the amount subscribed in the last three years. To come, however, to a more important point, was there any confirmatory evidence that our income from foreign investments was anything like 5 per cent. on 3,500,000,000*l*.? Were we getting an income of something like 175,000,000*l*. from the interest on capital invested abroad? First of all, we had our trade balance; we knew how much our imports exceeded our exports. For the current year it would be only about 140,000,000*l*. sterling. In 1903 it was 183,000,000*l*. Then they had a rough notion of what shipping brought in. Sir Robert Giffen calculated that it brought in 90,000,000*l*. a year, and if that calculation was anything like correct, we should be certainly receiving over 100,000,000*l*. a year now.

Mr. LAWSON said Sir Thomas Sutherland had pointed out that that was gross income; and that Sir Robert Giffen did not allow anything for expenses.

Mr. PAISH said the amount spent abroad relatively to the total was comparatively small. He had already started an investigation as to the amount of income we derived from shipping, but it was a very arduous task; it necessitated going to individual companies and asking them to analyse their books, which was not an easy thing to do. We were receiving a very large income from shipping. In the first place, as far as depreciation went, a big item must come to this country; secondly, coal went from this country; some of the coal was bought abroad, but a large quantity was shipped at home. Then came provisions; a good many provisions were bought here. As to wages, a considerable part of the wages and salaries paid came to this country. Then the profits all came home. When one came to the total result, it would be found that the greater portion of the gross earnings of the ships came back to England, and the amount was certainly very large—whether 90,000,000*l.* or 100,000,000*l.* he did not know. Since Sir Robert Giffen made his statement there had been a very large increase in shipping, and he doubted if our income from shipping was now much less than 100,000,000*l.* Thus, first of all there was interest—about 175,000,000*l.*; secondly, shipping; and thirdly, services. The services performed by the British people for other countries were very valuable; a large part of the business of buying and selling securities for the whole of Europe was done on the London Stock Exchange. People found it more convenient and cheaper to do this through London rather than in Berlin or Paris; and that brought us a great deal of business. Then, to take produce, a considerable income came to brokers in this country engaged in the purchase and sale of produce for foreign clients. For instance, a ship coming into the Channel laden with wheat was probably sold to the Continent through English brokers. Then there were the tourists. It was true the English people spent much money abroad, but numbers of Americans spent large sums in this country; and Colonial friends and foreigners who came to England spent money very freely. The tourist business was very large and profitable. Beyond that, there was a certain amount of remittances to Ireland and to this country, by way of gifts, from America. He had the honour of making an investigation for the Monetary Commission into the Trade Balance of the United States; and he came to the conclusion that the American people gave away each year to Europe 30,000,000*l.* sterling, of which no small share came to these islands. He thought there was no doubt that we in England, Ireland and Scotland received something like 5,000,000*l.* from the United States and Canada in the form of gifts to friends. There was also the income we received upon the return of Civil Servants and others from other lands with considerable savings. Then, insurance was a considerable item, and education fees for children here whose parents lived abroad. When one totalled up all these items, the amount of income which came to this country was very large indeed. He had not got to the end of the investigation, but he thought it reached at least 300,000,000*l.* a year. We were entitled to receive goods from other countries to the extent of over 300,000,000*l.* a year, and not to have to export a single pound's worth of goods against it. If that were true, and as far as he could see, it was true, it was evident that if we had a trade balance of only 140,000,000*l*. a year, we had a balance representing investments of capital abroad of something like 160,000,000*l*. to account for the difference. This was the figure he had arrived at. Mr. Beaumont said we did not receive interest from other countries, but left it there. In a sense, that was true. If people owed you money and you did not draw it, it meant that you were lending it back to them. But, as a matter of fact, it did come to this country. If Mr. Beaumont would look at the trade figures he would find that whenever we exported very little capital the exports were very small. If Mr. Beaumont would go back to 1890, when we were exporting a large amount of capital, he would recollect that our export trade reached to 263,000,000*l*.; the next three years it showed great decline, as Great Britain was investing very little capital abroad. Indeed, we did not invest much until 1904; but in 1904 we lent money to Japan for war purposes. From that time we began to lend freely again and our export trade began to expand quickly. In 1904 the export trade was only about 290,000,000*l*.; by 1907, the period of great expansion, it had grown to 426,000,000*l*.—or 136,000,000*l*. in four years—and the bulk of that increase was due to our increased loans of money to other countries. We were selling our produce, and taking payment in securities. Had it been otherwise, our exports would not have gone up, but would have remained relatively stationary. So also would the imports. But it was not so. When exports went up imports also went up in some degree. It was quite evident that when we exported capital it created a great demand for British goods. Our exports expanded and the imports too; it was essential that they should. When we were doing well we consumed freely, and in order to consume freely we must buy from other countries the foodstuffs, the additional foodstuffs, and the raw materials we needed. Again, if our manufactures increased, as they always did when we invested capital freely in other lands, we must buy increased quantities of raw materials to manufacture. Anyone who looked through the trade figures of the last sixty years would find that the exports went up and down in almost exact proportion to our willingness or unwillingness to invest capital. In the fifties, sixties, and early seventies we lent freely, and our exports expanded. In the later seventies we would lend to no one, and the exports fell severely, while our imports expanded. The amount of our investments in Ceylon was not very large, and, in proportion to our investments in India, was insignificant. With regard to the gold mines, in every case where the companies allowed for depreciation, and many of them did allow either for depreciation or development, the sums allowed were deducted from the profit received.

The following candidates were elected Fellows of the Society:—

Edward Alan Christian.
Hugh Dalton.
Walter Lee-Nash.
N. J. Malachowski.
Alexander M. C. Saunders.
Johannes Viereck.

MISCELLANEA.

Note on the Calculation of the Probabilities of Life at High Ages.

By John Brownlee and R. M. Morison.

The calculation of life-tables at the high ages is in general unsatisfactory. Neither are the available data above reproach, nor are the methods used in dealing with them fully justified. The need for the present investigation became evident in the course of some work at certain of the facts of immunity, which could not be satisfactorily understood without a fuller knowledge of the sort of error which occurs in these tables; it makes no pretence to be a complete investigation.

The data are of two kinds—the age-numbers of the population given at the census periods, and the age-deaths obtained from the ages of death as certified by the friends. This certification has varied in accuracy, and the direction of error has changed with the times. Before 1880 the tendency on the part of the friends was to exaggerate the ages of those whose deaths they registered, while since that time it has been to understate them. The inaccuracy of the past probably arose from a sort of vanity, that of the present is due to the fact that wrong ages have already been given for insurance purposes. It is likely that in the immediate future old age pensions will cause a swing of the error in the previous direction. The tables obtained from the census numbers and from the ages at death are easily compared, for at the higher ages the population has remained fairly constant. In order that this constancy may be maintained, the people who die above a certain age in any year must be balanced by those who cross that age. Therefore, to get the population at any age from the death returns, we have only to sum all the deaths above that age. The number obtained by interpolation from the census figures is compared with this, and the comparison gives a rough test of correspondence. The result for females in Scotland is shown in Table 1.

Table 1.—*Showing the number of females in Scotland living at high ages at each Census from* 1871 *to* 1901, *with the corresponding average yearly deaths above those ages for each decade.*

Year.	Persons being of age			Decade.	Average yearly number of deaths above		
	70.	80.	90.		70.	80.	90.
1871	7023·9	2584·9	356·5	1861–71	6495·9	2862·1	469·1
'81	7425·3	2891·9	345·6	'71–81	7348·8	2944·6	450·7
'91	8132·9	3234·6	426·1	'81–91	7310·5	3060·1	426·7
1901	8737·3	3412·7	422·4	'91–1901	8112·0	3238·8	460·1

It is evident that the two sets of figures roughly correspond, and, therefore, the same kind of error, whatever its nature, probably affects both. The census numbers, however, are in defect at the highest ages. Neither set gives directly any method by which the statistics may be tested. There are, however, two indirect tests, both applicable at ages above 50 years.

1. The change of death-rate with age may be taken as comprehended in a formula and a life-table constructed on the hypothesis of the death-rate alone.

2. The chance of life at any age may be obtained from the figures of the different censuses, for those who are 50 years old at one census should be 60 at the next, and 70 at the next again. Emigration will introduce an error; but emigration does not take place to any extent above the age of 50, and becomes a factor of less and less importance as age advances. The result of the emigration error will be to cause a slight underestimation of the chance of life, decreasing with age. This test is not of much use for local tables, but it is of great value when whole countries are considered. It affords, in particular, a ready method of comparing the mortalities of different countries when the death numbers are not available.

I. *Law of death-rate at high ages.*

Makeham's hypothesis ceases to apply beyond the age of 85, and so the formula derived from it is unavailable for our purpose, but the earlier formula of Gompertz appears to be eminently suitable. The supposition underlying it is that the death-rate increases in a geometrical progression with age; and observation of the tables shows that this is almost exactly true both for males and for females above the age of 50, the death-rate being approximately doubled with increase of ten years in life.

TABLE 2.

Age.	Males.		Females.	
	Death-rates per 1,000.		Death-rates per 1,000.	
	Actual.	Theoretical.	Actual.	Theoretical.
30— 35 ...	8·2	—	8·4	—
35— 40 ...	10·4	—	9·7	—
40— 45 ...	12·4	11·1	11·9	—
45— 50	16·2	15·7	12·6	12·2
50— 55 ...	22·0	22·2	17·7	17·4
55— 60	31·2	31·4	25·2	24·9
60— 65 ...	40·4	44·4	33·1	35·6
65— 70	58·7	62·9	49·4	50·8
70— 75 ...	81·3	88·9	69·6	72·7
75— 80 ...	121·6	125·87	106·5	103·8
80— 85	198·9	178·1	146·5	148·3
85— 90	255·9	252·0	236·6	211·9
90— 95 ...	383·9	356·9	318·1	302·8
95—100	421·1	504·4	396·4	432·8
100—105	530·0	—	400·0	—

Table 2 shows the correspondence between the figures obtained for Scotland from the death-tables and those obtained theoretically, on the assumption that such a law is obeyed. The figures represent the average death-rates over five-yearly age periods for the decade 1891-1901. The theoretical numbers were calculated from the others, between the ages of 40 and 95, by use of the method of least squares as applied to the logarithms.

With the females the correspondence is almost exact above the age of 45, with the males less so. Above 95 the theoretical numbers are larger. The figures for England are equally suggestive.

TABLE 3.—*Showing the death-rates per 1,000 of males and females for three five-yearly periods for England at the high ages.*

		55—65.	65—75.	75—85.	85—
Males	1886-90........	35·2	72·1	147·9	313·8
	'91-95........	35·9	72·5	149·3	291·0
	'96-1900....	34·1	68·3	142·9	282·6
Females	1886-90........	28·8	61·7	132·3	276·2
	'91-95........	29·5	63·1	134·4	264·2
	'96-1900....	27·4	58·4	126·8	258·5

Annual Report of Registrar-General of England, 1904, p. cxxii.

The almost absolute correspondence for males and females in England and for females in Scotland makes the increase of the death rate in a geometrical progression with age a probable law, and offers an approximation of at least as great accuracy as the methods at present in use for forming life tables at high ages. The males in Scotland do not approach the law so closely. From the age of 60 to the age of 80 there is a considerable defect in the deaths. Why this should be so is not clear.

If a law like this exist, and it is not *a priori* improbable (in the light of modern chemistry it means that the disintegration of some substance necessary to life follows the law of the monomolecular reaction), a formula is easily devised from this source for the population at any age. The following proof is really that of Gompertz, expressed in modern notation.

The death rate per unit time t is evidently $b\ e^{at}$ where b is a constant calculated from the data for the period of the origin of the curve and a is a constant independent of the origin.

If x be the number of persons living at a given time t, the number dying at that instant is $xbe^{at}dt$, which is equal to the decrease out of x, or $-dx = xbe^{at}dt$. Whence $x = Ce^{-\frac{be^{at}}{a}}$, C being the constant of integration.

To form a table for the high ages then, all that is necessary is to find the best values of b and a from the death-rate data, and thence to calculate the survivors at any time by the above formula. C is determined from the initial value of x. This formula throws some light on the theory of the life-tables at present used. In them the high age-values are calculated by logarithmic interpolation. This assumes that the curve most suitable for the graduation of the life-tables is of the form $x = e^{a + bt + ct^2 + \ldots}$ The present reasoning justifies this form as suitable. But it must be noticed that the age at which the formula becomes applicable is 50, and that therefore, for extrapolation for high-age calculations, no data earlier than this should be used. Probably because of neglect of this rule life-tables generally give fewer persons living at high ages than the formula. A comparison is shown in the following table. The theoretical values have been obtained by calculating C, b, and a for the first three values of the life-table, and thence calculating the higher-age values.

TABLE 4.

Age.	English life-table.* 1891-1901 (Females).		Age.	Scottish life-table.† 1891-1901 (Females).	
	Actual.	Theoretical.		Actual.	Theoretical.
55	535470	535470	55	516470	516470
65	402920	402920	65	383416	383416
75	219500	219500	75	209000	209000
85	59352	60048	85	55811	60724
95	4281	3757·4	95	2338	4898
105	—	10·137	105	4	29

* Dr. Hayward, *Journal of the Royal Statistical Society*, vol. xlvi, part ii.

† Dr. Adam, *Journal of the Royal Statistical Society*, vol. xlvii, part iii.

Dr. Hayward's values approach the formula much more closely than those of Dr. Adam. The theoretical values at 95 and upwards are much in excess of the table values. Though the theoretical death rates are in excess of those observed at the highest ages, more persons are found living at those ages than is generally thought possible. When it is remembered that in ten years two persons, one aged 103 and one aged 108, with apparently authentic ages, died in Guernsey, an island having a population of only 40,000 inhabitants, the numbers given at age 105 in Scotland do not seem excessive, twenty-nine persons in Dr. Adam's life tables corresponding to a little over one out of 2,000,000 female inhabitants.

II.

The other check on life table calculations remains to be considered. It is evident that a person who is 50 years old at one census will be 60 years old at the succeeding census ten years later. If no emigration takes place, then the number of persons at 60 years old divided by the number at 50 years old gives the chance of living ten years.

It is obvious that the possible error of this method is in defect of the true value of the ten years' life chance rather than in excess, since the emigration of people who are 50 at one census gives fewer people of 60 at the next. As a check we have the population estimated from the deaths recorded by summing them from any point to the limit of the highest ages. This is more and more in error the earlier the age chosen as a starting point, but at higher ages is more nearly correct. As another check we may use the formula already discussed. The results for females in Scotland for the several decades since 1871 are given for comparison in Table 5.

TABLE 5.—*Showing the chance of living ten years at various ages as found by the various methods.*

Method.	Chance of living ten years at age				
	50.	60.	70.	80.	90.
Comparison of the census					
Of 1871 and 1881	·7842	·6573	·4117	·1337	—
„ '81 „ '91	·7814	·6631	·4356	·1423	—
„ '91 „ 1901	·7871	·6605	·4196	·1305	—
Do. Logarithmic interpolation	—	—	·4116	·1330	·0217
Summation of deaths in decades (from the register)—					
1871–81	—	·7280	·4007	·1531	·0443
'81–91	—	·6497	·4186	·1394	·0441
'91–1901	—	·6405	·3978	·1421	·0289
Dr. Adam's life table	·8111	·6514	·4126	·1288	·0094
Formula method	·8115	·6536	·4206	·1713	·0275

It may be seen from this that the new census method and the death register give essentially the same results, and that Dr. Adam's table gives results much in defect at 80 years and very much in defect at 90 years. His method, based on extrapolation for values obtained prior to the age 85, evidently goes too far back, and is therefore untrustworthy. The formula method gives a very high value at 80, but one in essential agreement with those obtained from the census figures and from the deaths alone at the age of 90. As the formula from which these results were calculated was obtained from Dr. Adam's figures at the years 55, 65 and 75, it is obvious that essential agreement with Dr. Adam's results was to be expected at 50, 60 and 70. As a further comparison of the results of the new census method with those of the ordinary methods of forming a life table, the following figures for England may be given:—

TABLE 6.—*Showing the chance of living ten years at certain ages.*

Years.	Chance of living ten years at age of			
	English life-tables.		Census method.	
	60.	70.	60.	70.
1871–1881....	·6556	·3929	·6580	·3933
'81– '91....	·6537	·3827	·6732	·4023

Registrar-General's Supplement, part i. Decennium 1881-1891.

The correspondence is much closer in the first decade than in the second. At both age periods in the latter the life table is in some defect.

This method of comparing the probability of living at high ages affords an opportunity of examining the statistics of various countries. In these a like method has been adopted, the figures being obtained from Dr. Jacques Bertillon's "Recensements de la Population exécuté dans les divers pays de l'Europe." Some difficulty has been experienced from the changes of boundary and from the absence of census returns at certain dates in various European States during the last forty years, but the following results have been calculated :—

TABLE 7.—*Showing the chance of females of living ten years at various ages in certain countries in Europe.*

Country.	Period.	Age.		
		50.	60.	70.
Italy	1871–81	·7953	·5723	·3284
Portugal	'81–91	·8051	·6429	·4235
France..............	'81–91	·8090	·6326	·3701
Belgium	'80–90	·8311	·6983	·4051
Holland	'81–91	·8403	·6988	·4094
Bavaria	'80–90	·7871	·6202	·2736
Hungary..........	'80–90 ...	·7508	·5455	·3024
Finland	'80–90	·8339	·6698	·3646
Sweden	'80–90 ...	·8689	·7361	·4703

These results are too few to make the basis of many deductions, but the northern and southern races show distinctly more longevity than the central European races, as exemplified by Bavaria and Hungary.

The results of the investigations are: (1) At the highest ages the death rate numbers are in excess of those got from the census tables. (2) The formula method, though it gives a higher death rate, gives still more people living at the highest ages. (3) The error of tables as now constructed is probably principally in the direction of giving too few people at the highest ages.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Infant and child mortality.* Report by the Medical Officer of the Local Government Board of England and Wales. Supplement to 39th Annual Report of the Board (1909–10). London: Darling and Son, 1910. [Cd.–5263.] Price 1*s.* 3*d.*

This interesting and valuable report is announced as the first of a series of publications on this most important subject. The report is noteworthy in that it gives statistics for the whole country and the principal administrative (sanitary) divisions thereof (but excluding London, which is reserved for separate treatment), and in that it makes use of information submitted to the Board by local medical officers of health in their annual reports. Hitherto there has been no attempt to collate the local annual reports and thus to give a survey of the sanitary progress of the country as a whole.

The series of reports has been initiated with a threefold object:—(i) "to determine on the basis of our national statistics, whether reduction of infant mortality implies any untoward influence on the health of survivors to later years"; (ii) "to indicate the communities which are characterised by a continuing high rate of infant mortality"; and (iii) "to assess, so far as is possible, the relative values of the different factors of excessive infant mortality." In the present report the parts of the subject dealt with are (a) the relationship of infant mortality to mortality at higher ages, (b) the administrative areas having exceptional mortality (high and low) in 1909, and (c) the responsibilities of municipal administration and parental nurture for the existing rates of mortality.

A comparison of the mean rates for the periods of 1861–65 and 1906–09 shows that the rate of mortality under one year of age was only 23 per cent. less in the second than in the former period, as against 48 per cent. in the second year of life, 59 per cent. in the third year, and 61 per cent. in the fourth. It is also shown that a high infant mortality involves a higher mortality at each age up to adult life (20 years of age), the correlation co-efficient for the ages 0–1 and 1–5 being very high (0·88). The close connection between administrative slackness and excessive infant mortality is also clearly demonstrated.

Perhaps the most striking conclusion of the report—which is admittedly of a somewhat provisional character in the absence of an extended series of annual statistics of the kind given—is the proof that the alleged selective effect of infantile mortality is not supported by the data available: there may be a slight selective influence extending to the second or third year of life, but it is exceedingly slight at best. The fact that a high infantile mortality as the result of a bad environment does not connote any marked operation of natural selection and race preservation affords good hope of success attending the efforts which have been introduced within the last few years to check the lamentable wastage of infant life. The urgency of economising infant life is all the greater since the national mortality rate must be rapidly approaching its minimal level and the apparent national fertility continues to decrease without any suggestion of a slackening in the rate of decrease.

The Board and Dr. Newsholme are to be congratulated on this new departure in the official reports and it is to be hoped that this report may be taken as an indication of the Board's intention to render more generally available the facts and observations recorded in the numerous reports of medical officers of health. It is also to be hoped that this report foreshadows the use of administrative areas in our national statistics in substitution for registration areas. R.D.

2.—*La crise et l'évolution de l'agriculture en Angleterre de* 1875 *à nos jours.* Par Pierre Besse, Docteur en Droit. 395 pp. Paris: Félix Alcan. Price 10 francs.

The last quarter of the nineteenth century was perhaps the most interesting period from the point of view of economic history in the annals of British agriculture, though we are still too near to be able to see it in due perspective. It appeared to many of those who lived through, and were immediately concerned in it, as a time of unprecedented and strangely prolonged depression, similar in kind, though aggravated in degree, to former periods of agricultural depression; while to others it appeared as the end of all things, the final ruin of farming in this country. Slowly and painfully emerged the fact that agriculture was not suffering from a temporary calamity, like a time of bad trade or a panic on the money market, but was enduring the results of economic causes working out their inevitable effects with strain and stress, but with unerring certainty. In this book Dr. Besse has reviewed the course of British agriculture since 1875 with a fulness of knowledge and an acuteness of insight which are amazing in an observer from the other side of the Channel, and have rarely, if ever, been excelled by any native writer. Indeed, it is doubtful if there yet exists in English so complete and well-informed an individual treatise on this period as that which is here provided. The author has studied contemporary records with great industry. The list of publications, official and non-official, which he has consulted, given at the commencement of the volume, although, as he states, not claiming to be a complete bibliography, comprises not only all the chief official sources of information, such as the Reports of Agricultural Commissions of 1879 and 1893, the annual Agricultural Statistics, the Statistical Abstracts, &c., but also over seventy books or pamphlets by English, French, and German writers. He has also consulted the transactions of various societies, including those of this Society, to which he makes frequent references, citing not only from specific contributions such as the Report of the Committee on Meat and Milk and Sir Inglis Palgrave's estimate of agricultural losses, but also quoting statements made by speakers in discussions at the Society's meetings. With evidence of so much research, it may seem ungracious to criticise, but it must be confessed that the omission of the Journals of the Royal Agricultural Society is a somewhat serious deduction from the completeness of the contemporary chronicles. Evidence—which in almost all other respects is lacking—that the author is a student from the outside, rather than the inside, of his subject is also traceable occasionally in his failure to grasp the relative importance of his sources of information, and his tendency to treat authorities of very diverse weight as of equal validity.

The work is divided into three parts besides introductory and concluding chapters. The first part treats of the causes of the crisis—or as it is expressed in the "foreword"—"les transformations économiques qui ont déchaîné la crise," the second of the modes of adaptation to the altered conditions, and the third of the results of the evolution. In his introduction the author discusses the general position of agriculture in this country and its development up to the "seventies." He presents at the outset the view, not perhaps very familiar to the general reader, that Great Britain was not specially favoured by Nature in its soil, which as Arthur Young and M. Lavergne long since observed is generally inferior to that of France. The fertility of the agricultural land of Great Britain comes from the unstinted application of capital and labour to its "making" and not from the special bounty of Nature. Dr. Besse indeed is eloquent in his admiration for the achievements of British landowners and farmers and the results of the system which, as he declares, was best adapted to secure the highest results, and he draws comparisons, from the economic standpoint, with the results of farming in his own country, to the disadvantage of the latter.

From the special point of view of this Society the interest and value of the book lie largely in the careful marshalling of the statistical data tracing the progress of prices ("un fait c'est produit vers la fin du XIX^e siècle qui devait exercer . . . une décisive influence : la baisse des prix"), the course of supplies, home and imported, the fall of rents, the rise of wages. The figures are in the main taken from returns published by the Board of Agriculture and the Board of Trade, which the author has evidently studied with care. For the most part the statistics are introduced in the text or in short summary tables to illustrate each point, but a few serial tables are added in an Appendix. Occasionally the author extends the available data, and in some places adopts, perhaps a little too confidently, estimates on the many points connected with British Agriculture on which official figures are at present lacking. An example of the extension of existing data may be cited, as it deals with a report of this Society. In the Report of the Meat and Milk Committee a calculation was made of the annual average production of meat for a period of five years and a warning was given that the factors of the calculation, *e.g.*, the weight of carcass, the age of slaughter, &c., would not be equally applicable to other periods. Dr. Besse fairly recognises this fact but he nevertheless makes a calculation, on the same basis of the production of meat in 1871-5 and in 1903-7. But on the whole it must be said that the author has handled his statistical material carefully and conscientiously and has arranged it skilfully in the development of his theme.

Dr. Besse observes that the crisis in agriculture was caused by the disturbance of the equilibrium between the selling price and the cost of production, this disturbance being occasioned not by fiscal changes, but by the opening of new sources of supply and by the development of facilities for cheap and rapid transportation of commodities. He cites the increase in the tonnage of shipping since 1873 and the extension of railways since 1870, and refers to the introduction of cold storage about 1876. He quotes the statements of Cobden and of M. Lavergne that no harm, but the contrary, would come to British agriculture under Free Trade, and describes the eloquent prophecy of the latter as cruel irony in the light of the facts. He guards himself, however, from impugning the wisdom of the fiscal policy of this country, and he rejoices in the general commercial prosperity which we have enjoyed under it. At the same time, while recognising that British agriculture has in a large degree adapted itself, though with heavy loss, to the conditions of cheapness which have made for the advantage of the industrial community, he doubts whether in view of our insular position and our increasing dependance for daily subsistence on oversea food supplies we have not paid an excessive price, in the injury to agriculture, for the benefits we have received. R.H.R.

3.—*Economic annals of the nineteenth century*, 1801-20. By William Smart, M.A., D.Phil., LL.D., Adam Smith Professor of Political Economy in the University of Glasgow. xxxv + 778 pp. London: Macmillan and Co., 1910. Price 21*s.* net.

In the preface to this volume, which, it is hoped, will be only the first of a series, Professor Smart explains that having realised, in the course of his labours as a member of the Royal Commission on the Poor Laws and the Relief of Distress, that "the economic history of the nineteenth century has not yet been written," and being convinced that such a history is the chief requirement of political economy at the present time, he resolved not to attempt it himself, but to prepare the way by "the collection and arrangement of materials which the heaven-born historian, when he appears, may find ready to his hand." What he has done, therefore, is to take the record of Parliamentary debates and enactments contained in Hansard and, to a smaller extent, in the Annual Register, and from these two main sources, supplemented by Blue Books, memoirs, and other contemporary publications, and by a number of standard histories, economic and other, to construct a record, year by year, of the economic life of the United Kingdom (the title of the book suggests a wider scope than is really taken), including the movement of agriculture, industry and commerce, currency and banking, public finance and fiscal policy, the condition of the people, social reform and legislative enactments, proposals and discussions so far as they relate to these subjects. The record varies considerably in extent with the different years, and the material is naturally more abundant after 1815, when the nation, having succeeded in saving Europe "by its example," was at last free to turn its attention to its own salvation. The sixteen years 1800-15 occupy 460 pages; the next five years occupy no less than 300; and one has some fears as to the length of the work which Professor Smart has so courageously undertaken. The book opens with a sketch of conditions in the year 1800, and subsequently a pleasant break in the narrative is afforded by the inclusion of a chapter summarising the impressions formed by the French traveller, Louis Simond, during his tour and residence in Great Britain in 1810-11.

The standpoint adopted almost throughout is that of the annalist. Professor Smart has desired to direct attention to three special subjects: (i.) "The system of Protection as it presented itself to thinkers and statesmen in years when that system was universal, while all the time Adam Smith's doctrine of Free Trade was very generally accepted as theoretically sound"; "the lip-service paid to Free Trade, and the defence of Protection almost entirely on the ground of 'vested interests.'" (ii.) The phenomena of the cyclical movement of economic activity and contemporary discussion of their causes; and (iii.) "the evolution of the theory of taxation out of its practice." But whilst emphasising these matters by the amount of space allotted to them, Professor Smart is very chary of any comment which may serve to indicate his own views. Almost the only cases in which he indulges in any detailed commentary of his own are the Birmingham petition of 1817 (pp. 541 and 542) and the note on industrial cycles (pp. 606–9), *à propos* of the discussions in the same year on the prevalent economic distress; the object being in each case to urge that "the periodical unemployment of all classes, however skilled and capable," must be regarded as a normal condition, and that for those who believe in the continuance of the present economic system the adoption of a two-fold policy is necessary—"high education of the producer, both general and technical, and universal insurance to tide him over the 'bad times' which are quite inevitable under it." The value of Professor Smart's commentary, where we get it, is so considerable as to cause a feeling of regret that he should have deliberately imposed fetters upon himself. Extremely interesting as his "Annals" are, and great as will be their utility as guides to economic investigators, their value would have been much enhanced if they had been accompanied by more criticism. Professor Smart summarises debates on questions of commerce, industry and finance faithfully (thereby doing justice to a number of half or quite forgotten reformers, such as Whitbread, with his proposals for poor-law reform in 1807, and to the strenuous and patient efforts of such better remembered reformers as Romilly, Wilberforce and Brougham); he sets out carefully the reports and recommendations of innumerable committees, from the great Bullion Committee of 1810 downwards; he records many experiments in commercial and financial policy and a large number of statements made at various times as to commercial, industrial and social conditions; but normally we are deprived of any help (derived from Professor Smart's wide knowledge) in forming a judgment as to the weight to be attached to the arguments, and the amount of credence to be given to the statements which are so recorded. Thus, whilst the book is extraordinarily interesting, it is likely to be a little disappointing alike to the historian, who will find little criticism of sources, and to the ordinary reader, who usually wishes to be given a lead.

But Professor Smart would probably, if one may judge from his preface, regard such a criticism as indicating the exactitude with which he has achieved his purpose. In any event he has produced a work for which all students of social conditions will be extremely grateful; and their gratitude would be increased if the statistical data as to imports and exports and public revenue and expenditure could be brought together in summary tables, as well as scattered through the same number of chapters as there are years dealt with in this volume. P.A.

4.—*Massachusetts—Report of the Commission on Old Age Pensions, Annuities and Insurance.* [House: No. 1400.] 1910.

The problem of old age pensions, whether regarded from a social, political, economical, or purely statistical point of view, is full of interest, and the report to the Commonwealth of Massachusetts on "Old age pensions, annuities and insurance" is a distinctly valuable contribution to the subject. A Commission was appointed by the General Court of Massachusetts State in 1907 to "investigate and consider the various systems of old age pensions or annuities proposed, or in operation, in this Commonwealth, or elsewhere, and to report on the advisability of establishing an old age insurance or pension system in the Commonwealth." In the following year (1908) a sum of 3,000*l.* was granted by the State Treasury to enable the Commissioners to complete the investigation in greater detail. The Commissioners' report was presented to the General Court of the State in January, 1910, and affords conclusive evidence that the inquiry was thoroughly and efficiently comprehensive.

The instructions to the Commission required the investigation and consideration of (1) the various systems of old age pensions, annuities or insurance proposed or adopted in the State of Massachusetts or elsewhere; (2) the advisability of establishing such a system in the State; and (3) the probable cost of taking such action. The scope of the investigation included a special, but partial census of the aged population of the State, and the age limit selected for this special enumeration was 65 years, as, although 70 years is the minimum age for old age pensions in the United Kingdom and in Germany, 65 years is fixed as the pensionable age in most superannuation schemes. In these circumstances it was obviously desirable to ascertain the relative cost of providing pensions at the two age limits.

The persons specially enumerated for the purposes of this Commission were dealt with in eight sub-divisions:—(1) Inmates of prisons or correctional institutions; (2) Inmates of hospitals and of asylums for the insane; (3) Inmates of almshouses, corresponding with our workhouses; (4) Inmates of benevolent homes; (5) Recipients of public out-door relief; (6) Recipients of private out-door relief; (7) Recipients of State and military aid, of soldier's relief, and of federal pensions; and (8) Non-dependents, being persons aged 65 years and upwards who have never received aid from outside sources, public or private.

The tables in the report showing the result of this special enumeration in the Massachusetts State throw much valuable light on the social condition of its population above the age of 65 years. It is obvious, and indeed it is admitted in the report, that, whereas the statistics of the inmates of institutions are approximately accurate and complete, the same cannot be safely assumed regarding those of the recipients of public and private relief or aid, or of the non-dependent aged persons stated to have never received public or private aid. The total population of Massachusetts State, aged upwards of 65 years, in 1910, is estimated in the report at 177,000 of which 105,000 exceeded the age of 70 years. Thus of the Massachusetts population aged upwards of 65 years, 59 per cent. exceeded the age of 70 years. In England and Wales, at the last census in 1901, 58 per cent. of those aged 65 years and upwards were over 70 years of age. The population of Massachusetts, at all ages in 1910, assuming that the rate of increase, prevailing between 1890 and 1900, has since been maintained, may be estimated at about 3½ millions. The 177,000 persons, stated in the report to be aged upwards of 65 years, showed, therefore, a proportion equal to 50·1 per 1,000; the corresponding proportion of the population of England and Wales, at the last census in 1901, did not exceed 46·7 per 1,000. The excess in the proportion of elderly persons in the Massachusetts population is probably due to a low birth-rate in that State, and to the consequently small proportion of children and of young adults. The 177,000 persons aged over 65 years estimated to be living in Massachusetts in 1910, included 556 in correctional institutions, 1,961 in hospitals and insane asylums, 6,555 in receipt of in-door or out-door public relief, 4,910 in receipt of in-door or out-door private relief, and 27,230 in receipt of United States pensions; leaving 135,788 reported to be non-dependent. The most noticeable feature of these figures is the large proportion of the aged population in receipt of United States pensions; it appears that more than 15 per cent. of the Massachusetts population (male and female) aged over 65 years are in receipt of these pensions, mainly military. The natural result of the abundance of these military pensions is to reduce the proportion of persons in receipt of what is here known as poor-law relief. In Massachusetts, in 1910, only 6,555, or 3·7 per cent. of the population aged upwards of 65 years were inmates of the so-called almshouses, or in receipt of public out-door relief, whereas Mr. Charles Booth, as the result of careful investigation, came to the conclusion that very nearly 30 per cent. of the population of England and Wales, at these ages, were in receipt of in-door or out-door poor-law relief. It is also noticeable from the figures quoted above that in Massachusetts 4,910 persons aged over 65 years were in receipt of in-door or out-door private relief, a number not far short of those receiving the equivalent of our poor-law relief. No statistics showing the number or proportion of aged persons in the United Kingdom receiving aid from charitable sources are available, and it is not easy to estimate the difficulty that stands in the way of securing the trustworthiness of such statistics, invaluable as they would be in connection with the now impending reform of our poor-law system. The distinctive features of the statistics in the Massachusetts report under notice explain to a great extent the conclusions at which the Commission arrived on the points submitted for their consideration.

The problem of old age pensions or State insurance is of comparatively modern origin, and has for its main object an effective system of provision for the old age of worn out-workers, as a means for the retirement of workers at a reasonable age, and for removing this handicap on industrial labour. Germany led the way in 1889, when the Imperial Parliament passed the first Acts for old-age provision and invalidity insurance. Three of our Australasian Colonies have established old-age pension systems—New Zealand in 1898, New South Wales in 1900, and Victoria in 1901. Belgium, France, and Italy have also, in recent years, adopted special measures for the relief of old age. Our own Old-age Pension Act took effect on January 1, 1909; and the Canadian Parliament, in July, 1909, passed an Act providing for the issue of Government old-age annuities. The Massachusetts report states that "No American State, thus far, has established any general system of old age pensions or insurance"; and adds that "indeed Massachusetts is the first State to authorise a comprehensive inquiry into the pension and insurance question through a State Commission."

This report contains much useful and detailed information respecting many pension systems adopted by American and Foreign Industrial and Municipal Corporations, including the exceptionally liberal system adopted by the Krupp Company of Essen, Germany. It also discusses the old-age and superannuation benefits in our friendly societies and trade unions, and the now wide-spread system of industrial insurance.

In all debates and discussions concerning proposals for old-age pensions, three essential questions invariably call for consideration and decision:—(1) Should the pension scheme be universal or partial? (2) Should it be compulsory or voluntary? and (3) Should it be contributory or non-contributory? The report contains a full, careful, and impartial analysis of the various opinions that have been expressed on these various points in recent years by those who have devoted most serious consideration to the subject, and are thus best qualified to form sound opinions thereon. The probable cost of various forms of old-age pension schemes, as applied to Massachusetts, is also dealt with in much detail, affording conclusive evidence of the industrious care taken by the Commissioners to qualify themselves for making their final recommendations to the General Court of Massachusetts.

The following extract fully explains the grounds on which the Commission decided not to recommend any State system of non-contributory pensions:—

"The process of social betterment clearly manifest in the advance of wages, the increase of saving, and the decline of pauperism, will continue unless the forces that have been bringing it about are undermined by unwise social legislation. The main force to be conserved here is the spirit of individual initiative, independence, responsibility, self-reliance and ambition among the people at large. An experiment with non-contributory pensions would strike directly at this mainspring of social progress. The number of the deserving poor who really need pensions is, fortunately, not large in this State. By establishing a pension system for the benefit of the few who may perhaps need such aid, the State would strike a blow at the resources of thrift, individual responsibility and family integrity, which have enabled the great majority of the population to maintain themselves in self-supporting independence."

The report further expresses the opinion that:—"A non-contributory pension system is simply a counsel of despair, and if such a scheme be defensible or excusable in this country, then the whole economic and social system is a failure." The English pension scheme, it is stated, was adopted in response to a practically irresistible pressure for such action, but that fortunately no similar pressure has been felt in Massachusetts, and that therefore it is at least premature to consider any scheme of non-contributory pensions.

With reference to proposals for the adoption of compulsory insurance, the Commission also consider them to be inexpedient, the practical objection to the principle of compulsion being so weighty. Moreover, this practical objection in the Commonwealth appears to be strengthened by constitutional difficulties that stand in the way of any workable scheme of compulsory insurance. The Commission, therefore, came to the conclusion that "if any new pension scheme were to be instituted in this State, at the present time, it should be contributory and voluntary," although, "as a matter of fact, experience with voluntary contributory schemes points to the inevitable conclusion that such a system could never become universal in its application."

The final conclusion arrived at by the Commission in this report is "that serious practical difficulties stand in the way of the establishment of any general system of old-age pensions by this Commonwealth, or by any single State. Such action would place a heavy burden of taxation on the industries of the State, and would thus put them at a disadvantage in competition with the industries of neighbouring States unburdened by a pension system."

This report is full of interesting facts and comments, and should receive the careful consideration of all who are interested in the important problem of State provision of pensions or state insurance.

N.A.H.

5.—*Wage-earning women.* By Annie Marion MacLean, Ph.D. 202 pp., 12mo. New York: The Macmillan Company, 1910. Price $1.25 net.

The National Board of the Young Women's Christian Association, on its inception in the United States at the end of 1906, formed a Sociological Investigation Committee in order to investigate and study the possibilities lying before the association movement throughout the country. From the reports of a staff of 29 women, holding degrees from 17 colleges, Dr. MacLean has compiled a little book of great value.

With the exception of a few tables as to occupations and nationalities of women in different States taken from the Census, and a useful and compact table showing the types of legislation for wage-earning women in the different States, the report contains hardly any statistical material. But it is, nevertheless, exactly the kind of book which a statistical student of social conditions should greatly appreciate, concerned as it is with discovering the essentially important facts of the life of working women.

The medical specialists have so far made little statistical inquiry into many important questions suggested by this investigation. Naturally enough, these college students refer continually to the nervous waste and destruction which they assume must result from the vibration and noise caused by machinery in factories. In our Lancashire weaving sheds these conditions are the first which strike a visitor from the outside. But has anyone made a scientific study of their effects ? Although many results of working conditions are hardly definite until after marriage, very few records of the previous industrial history of mothers have been kept by medical men in such a way as to throw statistical light on the effects of continuous standing, continuous sitting, employment in childhood, monotonous specialised effort, &c. Another symptom of overwork to which this report draws attention, the passion for violent physical excitement, needs attention from the psychometrician. It is generally misunderstood, and is frequently alleged as a proof that the operative is not unduly exhausted by her day's labour.

The book is full of intelligent and suggestive observations, and the area of investigation is always clearly defined and tabulated.

C.E.C.

6.—*Die Kaufpreise für ländliche Besitzungen im Königreich Preussen von* 1895 *bis* 1906. Von Walter Rothkegel. (Staats- und sozialwissenschaftliche Forschungen. Herausgegeben von Gustav Schmoller und Max Sering. Heft 146.) x + 365 pp., 8vo. Leipzig: Duncker and Humblot, 1910. Price 10 marks.

This study of prices of rural properties in Prussia during the period 1895-1906 will probably not appeal to many people outside Germany. Perhaps its main interest for English readers consists in the light it throws on that elusive phenomenon "unearned increment" in regard to Prussian rural values. The prices of rural properties in Prussia are found to vary from one another mainly because of climatic and market conditions. When small areas are considered the quality of the land becomes an important factor. During the twelve years under observation, prices and values increased over the whole State. But, argues the author somewhat unconvincingly, if the increase were due to a favourable "conjuncture" (in which case there would be "unearned increment") good and bad land would have shared equally in the upward movement. The statistics show, however, that the lands of indifferent quality have increased in value much more than the better lands. This is attributed to the enterprise and intelligence of the farmers, who have learnt only in recent years how to use and cultivate the poorer lands to the best advantage. Hence the increment of value here arises from personal effort and expenditure of capital. The doubtful principle is suggested that the best measure of the influence on value of the "conjuncture" is given by the increase in value of the best and most productive lands, since the net returns of these are not likely to be substantially raised by better culture. As already stated, these lands have increased in value much less than the poorer lands. The average increase over the whole State is put at 6—12 per cent., and one can quite well believe that over large districts no material increment in value has occurred which is not to be traced to the expenditure of labour and capital (p. 70). It is, of course, what one would expect to find in the case of large rural areas in an old country. The author admits that inquiry into smaller areas might yield different results in particular localities.

The bulk of the book is occupied by tables showing, in great detail, the data which form the subject of this painstaking investigation. A.D.W.

7.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Alston (*Leonard*). Elements of Indian Taxation. Elements of the Theory of Taxation, with special reference to Indian conditions. ix + 115 pp., sm. 8vo. London: Macmillan and Co., 1910. Price 2*s.* net.

[Deals with recent criticisms of methods of taxation in India, which in the opinion of the author show a strange lack of perspective, the writers failing to grasp that it is impossible to criticise parts of the methods of taxation satisfactorily except in relation to the system taken as a whole.]

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* See also "Additions to the Library," page 245, *sqq.*

Atton (*Henry*) and *Holland* (*Henry Hurst*). The King's Customs. Vol. 2. Account of Maritime Revenue, contraband traffic, the introduction of Free Trade, and the abolition of the Navigation and Corn Laws, from 1801 to 1855. With Preface by F. S. Parry, C.B. viii + 506 pp., 8vo. London: John Murray, 1910. Price 10*s*. 6*d*. net.

[This volume, which completes this interesting work, deals with the period of transition from high protective duties to unrestricted commercial exchange. Its appearance synchronises with the important change in the customs and excise services, whereby full control of indirect taxation of the United Kingdom is transferred to a single authority.]

Barrington (*Amy*) and *Pearson* (*Karl*). Galton Eugenics Laboratory Memoirs. XIV. Preliminary Study of Extreme Alcoholism in Adults. With the assistance of David Heron, D.Sc. 4to. London: Dulau and Co., 1910. Price

Bertillon (*Dr. Jacques*). Des causes de l'abaissement de la natalité en France et des remèdes à y apporter. 55 pp., 8vo. Paris: V. Giard and E. Brière, 1910.

Cannon (*Henry W.*). The National Banking System. 23 pp., 4to. Harvard University, 1910.

[A short historical account of the American national banking system, and of the benefits the country has derived therefrom. The author thinks a central bank would add strength to the American financial system besides providing additional currency.]

Dodd (*Walter Fairleigh*). The Revision and Amendment of State Constitutions. (Johns Hopkins University Studies. New Series. No. 1.) xvii + 350 pp., 8vo. Baltimore: The Johns Hopkins Press, 1910.

[Contains an interesting statistical chapter on the working of the constitutional referendum in different States.]

Eaves (*Lucile*). History of California Labor Legislation, with introductory sketch of the San Francisco Labor Movement. (University of California Publications in Economics. Vol. 2, 1910.) xiv + 461 pp., 8vo. Berkeley: The University Press, 1910.

[A full study of Californian labour legislation and the development of the economic conditions of workers.]

Fishberg (*Maurice*). The Jews: a Study of Race and Environment. xix + 578 pp., 8vo. 1910. The Walter Scott Publishing Co., Ltd.

Kestner (*Dr. Fritz*). Die Ausführungsbestimmungen zu den Reichssteuergesetzen auf Grund der Reichsfinanzreform von 1909. Textausgabe mit alphabetischem Sachregister. 624 pp., 8vo. Leipzig: C. L. Hirschfeld, 1910. Price 6*s*. 6*d*.

——— Reichssteuergesetze nebst Ausführungsbestimmungen auf Grund der Reichsfinanzreform von 1909. Band 1: Reichssteuergesetze. Textausgabe mit Anmerkungen und alphabetischem Sachregister. 539 pp., 8vo. Leipzig: C. L. Hirschfeld, 1909. Price 5*s*.

[A useful compilation of recent German financial legislation and customs regulations with the text of the laws, which are fully indexed.]

Latham (*Baldwin*). The influence of underground waters on health. 15 pp., 8vo. London: Royal Sanitary Institute, 1910.

[A study of the relations between water and disease, and of the dangers of the pollution of underground waters.]

McPherson (*Logan G.*). Transportation in Europe. 285 pp., 8vo. London: Constable and Co., 1910. Price 5*s*. net.

[Based upon the author's investigations in Europe on behalf of the American Waterways Commission. The book deals with roads, railways, and inland waterways and their traffic, and describes the different phases of their control by Government.]

Mahaim (*Ernest*). Enquête sur la situation hygiénique des habitations ouvrières dans la Commune de Herstal. 224 pp., 8vo. Liège: Comité de Patronage des Habitations Ouvrières, 1910.

March (*Lucien*). Essai sur un mode d'exposer les principaux éléments de la théorie statistique. 42 pp., 8vo. Nancy: Berger Levrault and Co., 1911.

——— Pour la Race. Infertilité et Puériculture. 32 pp., 8vo. Paris: Félix Alcan, 1910.

Mayr (*Dr. Georg von*). Statistik und Gesellschaftslehre. Band 3. Sozialstatistik. (Moralstatistik, Bildungsstatistik, Wirtschaftsstatistik, Politische Statistik.) Lieferung 2, pp. 257—450, 8vo. Tübingen: J. C. B. Mohr, 1910.

[This portion of Dr. von Mayr's book deals with statistics of suicides and criminal statistics. The former are considered in relation to nationality, occupations, age, sex, and civil condition.]

Otto (*Rose*). Über Fabrikarbeit verheirateter Frauen. 299 pp., 8vo. Stuttgart: J. G. Cotta'sche Buchhandlung Nachfolger, 1910. Price 6*s*. 6*d*.

[A statistical study of the effects of the employment of married women in factories in England and Germany, and of legislation in both countries as to its regulation.]

Pearson (*Karl*) and *Elderton* (*Ethel M.*) Galton Eugenics Laboratory Memoirs. XIII. Second study of the Influence of Parental Alcoholism on the Physique and Ability of the Offspring. Being a reply to certain Medical Critics of the first Memoir and an Examination of the rebutting evidence cited by them. 4to. London: Dulau and Co., 1910.

Sandy (*William C.*), M.D. Studies in heredity, with examples. 13 pp., 8vo. 1910.

Seyd (*Richard*). Statistics of Failures in the United Kingdom during 1910. 2 pp., fol. 1911.

Vandervelde (*Mme. Lalla*) and *Jacobs* (*M. F.*). Labour Laws for Women and Children in Belgium. 16 pp., 8vo. 1910.

Virgilii (*F.*). Statistica. Quinta edizione rifatta. xx + 228 pp., sm. 8vo. Milan: Ulrico Hoepli. Price 1 lire 50 c.

[The first edition of this useful little manual, which gives a clear exposition of the scope, objects and methods of statistical science, was reviewed in the Society's Journal for 1891. The present edition (fifth) brings the work up to date.]

Weulersse (*Georges*). Le Mouvement Physiocratique en France de 1756 à 1770. Tomes 1 et 2. 8vo. Paris: M. Felix Alcan. 1910. Price 25 francs.

[This work is a portion of a history of the Physiocrats which the author hopes to complete, though after the period with which the present work deals their influence was on the wane. It is divided into five books, and besides a full table of contents contains a useful bibliographical index.]

Wolfe (*S. Herbert*). The Examination of Insurance Companies. A series of talks to the members of his office staff. 248 pp., 8vo. New York: The Insurance Press, 1910.

[These articles will be of interest to those wishing to obtain information as to the different forms of insurance in force in the United States.]

Wood (*George H.*). The Woman Wage-Earner. 15 pp., 8vo. Huddersfield, 1910.

Italy. Notizie sulle variazioni del salari e degli orari nell' industria serica italiana dal 1901 al 1907. Fol. Rome: Officina Poligrafica Italiana, 1908.

[A statistical report on variations in the wages and hours of labour of workers in the Italian silk industries during 1901-1907.]

CORRESPONDENCE.

Influence of Parental Alcoholism.

To the Editors of the "Journal of the Royal Statistical Society."

SIRS,—I shall esteem it a favour if you will permit me a few words of reply to what, from my standpoint, is a most misleading letter from Mr. Keynes in your last issue. The main, but not the only, point to be corrected is the statement made on p. 117:—

"In the controversy between Professor Pearson and Dr. Marshall the question arose as to whether the drunken (*sic!*) earned *on the average* as high wages even as the sober inhabitants of the low (*sic!*) district. Professor Pearson having asserted that there was not a difference of more than 1*s.* a week, Dr. Marshall suggested that he made no allowance for the casual and irregular nature of the work of many drunkards. Professor Pearson then drew up a table, reprinted on pp. 11 and 11 (of my pamphlet), which was intended to support the statement in his (*sic!*) original memoir that 'the average wage of a drinker is 25*s.* 6*d.* and of the temperate 25*s.* 5*d.*'"

Now there are several words here which require comment. The use of the word "drunken"[1] is, from the standpoint of the writers of the memoir, entirely unjustified. We defined our alcoholic class to consist of those persons who, "in the opinion of trained social workers—assisted by the judgment of police and employers—are drinking more than is good for them or their homes." (*Memoir*, p. 3.) This is a very different thing from "drunken." Why does Mr. Keynes seek at once to bias the reader by using a word which begs the question? In the next place, why does he repeatedly use the words "low district" or "slums"? One of the questions at issue is the nature of the district, and we entirely differ from Professor Marshall and Mr. Keynes on this point. A large public elementary school does not draw all its children from any one class, and this point was fully recognised by the Committee of Investigation. They write in their report of the school:—

"It has upon its rolls children from the poorest parts of the city, and yet it has also an admixture of the substantially comfortable and thoroughly respectable working class . . . In the poorest part of a city of many centuries' growth there are also *many* 'old families,' who continue to reside in the houses their fathers and grandfathers lived in for old times' sake, despite the degeneration of the immediate neighbourhood. *This gives the school a widely representative character, which especially commended itself to the Committee in making its selection.*" *Report*, p. 2.

We believe that the members of the Edinburgh Committee knew what they were saying in the words we have italicised, yet Mr. Keynes speaks as if the school were solely fed by the "slums," and Professor Marshall, who deliberately changes the *many* into "few" and "some," states that the inhabitants "congregate in an atmosphere that is foul physically and morally, where even the sober residents are, as a rule, weakly in body and devoid in self-respect." Instead of this controversial begging of the question it would be interesting to know what Professor Marshall and Mr. Keynes consider the district "*widely* representative" of, if not of the bulk of the rather poorer working classes in our non-manufacturing towns. All I can say is that the picture we shall shortly give of even the English manufacturing towns differs, for the bulk of the working classes, not necessarily for the *few* selected best working-class families, very little indeed, except in a somewhat smaller percentage of drinking, from the Scottish sample. Anyhow, I protest strongly against a population which those who actually came in contact with it considered to be of a "widely representative character," being described by those who were not engaged in the investigation as, "with few exceptions, of a low grade character." Mr. Keynes argued that the district in Edinburgh must be non-representative because 72 per cent. of the population live in one- or two-roomed tenements, and that such a population must be that of a low district or slum. Now that population was selected by taking all the children of a public elementary school, and what does Mr. Keynes do? Why he asks me to look at the *Census* returns and note that only 48 per cent. of families in Edinburgh live in one- or two-roomed tenements. He then argues that a population with 74 per cent. must be one of the lowest in the town! He has entirely overlooked the fact that there is in Edinburgh a large residential population of the better classes. What Professor Marshall and he did was to argue that a population of children of the *working classes*, with 72 per cent. in one- or two-roomed tenements, was *ipso facto* a population "living under the worst slum conditions," and therefore quite untrustworthy as a sample. Now the only way to reply to such a statement is to consider how large is the population which is comparable with the Edinburgh material. As far as I am aware no tabulation of the home conditions of the *children* in other public elementary schools in Edinburgh is available—the *Census* provides no statement as to the homes of the children of the working classes—but we have details as to the homes of the great bulk of the children of the Glasgow working-class population, and from these returns it was easy to discover that 84 per cent. of the children of the elementary schools of Glasgow have precisely the same conditions as the Edinburgh children with whom we were dealing. Mr. Keynes says that I argue that our district in Edinburgh "may not be worse than the slums of other large towns." I have argued no such point, because I do not see any advantage to be gained by using the word "slum." What I said was that a characteristic of the homes of the Edinburgh children, which was shared by 84 per cent. of *all* Glasgow public elementary school children, cannot be taken as marking off a wholly differentiated population "living under the worst slum conditions." A population which embraces tens of thousands of children is, at any rate, worth studying for its own sake, and if, as I think is demonstrable, the alcoholic are as numerous in it at Glasgow as at Edinburgh, it will be interesting to know from what other class of the population the large alcoholic section of this class is supposed by Mr. Keynes to have fallen.[2]

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[1] Note also how, on pages 119 and 120, Mr. Keynes tacitly changes my use of the word "drinks," as previously defined, to "Drunken"!

I now turn to the next point in the statement of Mr. Keynes which I have cited at the beginning of this letter. He states that I drew up a table to support the statement in *my*—I presume he means Miss Elderton's and my—original memoir as to the average wages of drinking and non-drinking groups. I should have thought it unnecessary to state that that table served no such purpose whatever, and the only object that Mr. Keynes can have in citing the results in the manner he does is to suggest to the reader that our wage data were in some manner based on the returns he illustrates, and that they are therefore absurd. Thus he makes such astonishing statements as that "Professor Pearson *does not hesitate* to reckon No. 227, who has done no work for seven years, as though he earned normal wages," or again "No. 147, who is now a teetotaller, *evidently* counts as drunken"—the italics are mine.[3] Well, I have no doubt that No. 147 did count as a drinker, not as "drunken," when his influence on the children was being considered since he was a "hard drinker" until his wife's death, but I must protest against being told that I have treated a man in an asylum as earning full wages, or a drunken tram-driver in prison as receiving 27*s.*, or a clerk out of work and supported by his wife's brothel as receiving a like wage! Surely Mr. Keynes' common-sense has failed him, when he came to make such statements without a word of caution in *my* name!

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[2] Mr. Keynes, in a footnote, refers to another point I criticised in his evidence for the "slum" nature of the Edinburgh population. I said that a *class* difference between the children of public elementary schools for each age group of about 2 inches in stature and 4–5 lbs. in weight from the like characters of children in secondary and higher grade schools was a well recognised fact, and that its existence would not suffice to differentiate a particular public elementary school from the bulk of schools providing for the children of the working classes. Mr. Keynes wrote as follows in his review of our memoir in this JOURNAL:—

"The average weight of the children is below the normal (*sic!*) to a similar extent, and the deficiency becomes more marked as the children grow older. Boys of 14 weighed on the average 21 lbs. less than in the Edinburgh Public School; girls of 14 weigh 23 lbs. less than in the Public School, 25 lbs. less than in the Higher Grade School. These figures also the memoir omits and ignores."

Our memoir, of course, omitted any special consideration of them because they compare averages of 2 girls of 14 and 5 boys of 14 *left* in a public elementary school with higher grade schools with their full complement of boys and girls of the age of 14 belonging to a different social class. The actual measurements for children of *lower* ages show the very differences we are accustomed to in passing from working class schools to schools of a higher social grade. How does Mr. Keynes endeavour to get over the blunder of citing averages based on the remnants of the 14-year-old class—5 boys and 2 girls—left in a public elementary school, all children of which leave at 14? Instead of acknowledging his blunder, he says: "the scantiness of the *data* is more damaging to Professor Pearson, who seeks to derive positive results from them, than to his critics, who do not." I do not know what results I ever sought to draw from these seven children, but the words I have quoted above from Mr. Keynes' own paper exhibit the sort of results which are drawn from them by a critic, who, in the same breath, says that he draws nothing from them but that we do, and, in the previous breath, tells us that we have ignored and omitted them!

[3] An examination of the wages Mr. Keynes attributes to the sober and drinking sections selected by him will, I think, serve to show the degree of impartiality with which he approaches the whole question of alcohol.

The fact is that if Mr. Keynes had read a little more closely the memoir and my controversy with Professor Marshall, he would have seen the exact bearing of the table and the wages cited Professor Marshall made, without citing any data at all, the following statement with regard to the Edinburgh population: "the strong drunkard probably came down to that *low-grade of work* merely because he was a drunkard, while the sober man probably came there because he had not sufficient character and physique to earn a comfortable living anywhere." He had gone still further and suggested that our drinking class would have been receiving 40*s.* a week but for their drinking, and that they were strong men whom a foreman would select for *low-grade* jobs at the docks. I replied that, instead of assuming this, Professor Marshall should *classify* the trades, and later, as he failed to do so, published our own classification. That classification showed that the drinking and non-drinking sections were scattered indiscriminately through *all* trades; the drinking sections were *not* men who had sunk to low-grade jobs, as suggested by Professor Marshall. We then sought to enquire whether on the whole those who took alcohol followed the trades requiring less intelligence or less strength. The only way to classify trades in some approximate manner according to the intelligence and strength required in them is to classify them by the average wages received by that trade. For this purpose it was wholly sufficient to take the wages stated by the Investigation Committee itself to be the wages of the trade in question. These are given on p. 18 of the *Report.*[4] These are not absolutely, but for our purposes sufficiently representative of the grade of the trade. The point here

[4] Mr. Keynes attempts, on his page 119, to make capital out of a railway porter misprint. If this be a misprint, although the tables on pages 8—18 occasionally correct the later text, then no allowance has been made for tips, which average a large proportion of the porter's earnings. It is noteworthy that if we take the wages of the railway porters as given in the later text (18*s.* and total weekly income 15*s.*, see Nos. 57 and 404), then these men belong to the lowest grade of labour; one of these men is a teetotaler and the other sober! Of the total railway service represented, a sober guard with 45*s.* heads the list, a drinking railway checker (29*s.*) and a drinking stoker (25*s.* 6*d.*) come next. A sober railway man (25*s.*), a drinking railway painter (25*s.*, average 21*s.*), a sober railway checker who leads an irregular life (20*s.*), a drinking platelayer (18*s.*), follow, and then the two sober porters. Excluding the exceptional case of the guard, who belongs to the aristocracy of labour, the wages of the drinkers are 23*s.* 4½*d.* and of the sober 19*s.* 3*d.* without tips. If we include the case of the guard, 24*s.* 5*d.*, which agrees very well with our extra 1*s.* as the price of sobriety.

was the grade of the trade and not the comparative wages of the sober and drinking sections. Any slips or misprints then to be of validity in the argument must be shown seriously to affect the classification of the trades as adopted by us on the basis of the wages provided by the C.O.S. Committee.[5] Those who assert, like Professor Marshall did, that the drinking section followed low-grade jobs may, I think, be called upon on the basis of our classification to indicate what classification is a more reasonable one in their own estimation. I shall be interested to see how far it modifies our statement that both sections were distributed through all the trades, and that on the whole the alcoholic, if anything, followed the higher and not the "low-grade" work.

And this leads me directly to the really fundamental point in the whole of this discussion on wages. What bearing has the question of wages at all on our investigation? Why, *solely* as an index to the trades followed by the sober and the alcoholic. We are not fundamentally concerned with the economic value of the drinker as a workman, but with a measure of what his health and physique were like apart from his alcohol. If he was differentiated physically and mentally before he started to drink from the sober then it appeared reasonable to suppose that the offspring in the two classes by the simple laws of heredity would be differentiated quite apart from the alcohol. It was to guard to some extent against this possibility that the wage question was investigated. It would have suited our purpose to have used the wages current in the district in the class of labour followed by the individual had we known them, because our object was to show that the physique and ability of the alcoholic were not differentiated from those of the sober *initially*, and the rough estimate of this is the wage of the trade the individual follows. When a man owing to drink is receiving low wages as a blacksmith or a lithographer, we do not believe with Professor Marshall that he has sunk to these trades owing to drinking. A trade is as a rule chosen early in life and according to capacity. A man may fall to casual labour, but a trade which requires training is the choice in general of a pre-alcoholic period. That is the importance of that classification of trades, which Professor Marshall tells us has no bearing on the problem he professes to discuss, *i.e.*, that the alcohol users were fallen better stock and the sober poor subnormal stock in our Edinburgh material. It is the capacity for wage-earning when employed, rather than what is actually earned by work, broken by bouts of drinking, which is the index we need for the original physique and ability of the alcoholic. Mr. Keynes and Professor Marshall seem to suppose that the equality of the wages of the sober and alcoholic groups is necessary for our position, that the parental alcoholism has no marked effect on the offspring. On the contrary, it would be a markedly higher wage-earning power in the alcoholic group which would upset our results for it would show that the alcoholic groups were physically or mentally superior, and thus heredity might balance alcoholism.[6] It is clear that a wage averaged over wageless periods induced by excessive drinking would cause us to underestimate the capacity of the alcoholic section, and that the nearer we can get to the wage the man could earn in his normal state, the nearer we shall be to the wage as true index of his non-alcoholic capacity. I owe this fuller explanation of the origin of her treatment of the wage problem to Miss Elderton, and it seems to me sound. She was seeking some method of ascertaining whether the alcoholic section was *initially* differentiated in physique and intelligence from the non-alcoholic. That I think is best shown by a classification of trades, but the wage-earning power when sober is also of weight, as an indication that the alcoholic were not initially inferior to the sober in physique and intelligence. That the drinkers, especially the bout drinkers, will be found more frequently out of employment and therefore swell the irregular and casual groups of wage-earners was fully admitted by me in my pamphlet (*Questions of the Day and the Fray.* I: Dulau and Co.). Thus I wrote:

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[5] The reader will see from this account how absurd is the sort of charge Mr. Keynes makes, *e.g.*, p. 120: "It will be noticed that Professor Pearson does not hesitate to reckon No. 227, who has done no work for seven years, as though he earned normal wages."

"19 per cent. of drinkers and 14 per cent. of the sober have been recorded as sometime 'out of work.' This is quite compatible with the percentages, 56 per cent. and 49 per cent. we found for the two classes in receipt of some form of charity; the percentages of the drinkers being in both cases swelled by the bout-drinkers, who from the very nature of the case are likely to be idle and their families seeking relief during their bouts. There is no evidence in these results of the drinkers or the temperate being originally physically or mentally differentiated classes." (p. 9.)

I have asked Miss Elderton to go very carefully through the wage statistics[7] of the *Report* again. In this investigation she left out from the "regular" group all the wages stated to be earned by the individual, if at the time of the inquiry he was out of work. This I hold is not a correct means of estimating the relative physique and intelligence of the alcoholic and the sober, because there will always be a larger percentage of drinkers at any given time out of employment. Data were available in the case of 623 men, 56·5 per cent. of whom fell into our category of drinkers, 43·5 per cent. into that of sober. At the time of the inquiry 55 men were either idle, ill, in prison, or could have no wages assigned to them, of these 63·6 per cent. were drinkers and 36·4 per cent. sober, showing an increase of 7·1 per cent. on the general proportion of drinkers. Turning now to those whose wages are stated, they were divided into the following classes: regular, average, casual, irregular. When the regular wage was given but it was stated that the man had been out of employment sometime during the year, or that his wage when working was so and so, he was included in the irregular workers. Of such workers there were 46 recorded, 63·0 per cent. among the drinking section, 37·0 per cent. among the sober, the mean wages stated for the irregular workers was 27*s.* 0*d.* for the drinking section, 27*s.* 1*d.* for the sober.

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[6] That this view was a possible one is indicated at more than one point of the *Memoir.* See, for example, our conclusion (4) on p. 31.

[7] I should differ from Mr. Keynes in the value to be attributed to the general data as to wages in the *Report.* "In all but a *very* few cases," the Secretary writes to me, "the employer vouched for the correctness of, or else himself corrected, the statement of the man, woman, or child; and where further verification could be had from a trades union or friendly society it was obtained. 'Regular wage' meant all the year round, with the exception of the July trades' holidays, the statutory holidays, and the few days some firms give at the New Year. We always stated if the man was idle when visited, or in the general remarks amplified that by explanation for each individual case. We certainly took very considerable pains over the wages question, getting as much verification as possible. But at the same time we were not in a position to say that any man received 52 weeks' wages in the year. We certainly tried to indicate if a man was casually or regularly employed."

The "casual" section is a difficult one, because two separate influences are at work. It covers the trades which are essentially casual[8] apart from alcohol, *e.g.*, painters, and also individuals whose alcoholic tendencies prohibit their following anything else but casual occupation. Whenever the recorders gave the occupation as casual, but stated the average wages, the individual was transferred to the third or average group. The casual group covered 112 cases, of whom 70·5 per cent. belonged to the drinking section and 29·5 per cent. to the sober. The mean wages of the drinkers were 24*s.* and of the sober 22*s.* 8*d.* It will be noticed that in both the irregular and casual groups the wage value of the drinker is practically as great or greater than the wage value of the sober, although there is an excess of such irregular and casual workers among the drinkers. Further, if we turn to the cases in which the "average" wages of those not in regular employment is provided, we find 80 individuals, 57·5 per cent., in the drinking section, 42·5 per cent. in the sober, or practically the same percentages as in the general population. Of these the mean wage of the drinking section is 23*s.* 7*d.* and of the sober section 26*s.* 1*d.*, showing that the alcoholic are more often unable to follow their

[8] The word is a dangerous one to use, because the reader at once associates it with casual labourers on low-grade work. This is not the meaning here. Thus, No. 40 is an ironmoulder who makes 37*s.* to 42*s.* a week when he will work, and No. 147 a blacksmith who gets 30*s.* a week when in full work (this is the man who was a hard drinker till his wife's death). Or, again, the whole series of painters with wages at 36*s.* when employed, or averaging 30*s.*, the jobbing confectioner, the tailor, the joiner or the mason with irregular or casual employment, with wages varying from 30*s.* to 40*s.* when they have work (or more generally when they *will* work), show how this casual group contains much highly-skilled labour, and is not identical with a mere casual labourers' group. The necessity for this footnote arises from the possibility of the reader thinking, because the drinking classes are in excess in the irregular and casual wage groups, they therefore follow "low-grade" trades. It is quite conceivable that highly-skilled trades with high wages but irregular employment are partly responsible for the drinking. The reader should consult the classification of the trades in my pamphlet, pp. 10, 11.

occupation. Lastly, taking the 330 individuals in receipt of regular wages, 50·6 per cent. of these were sober and 49·4 per cent. belonged to the drinking section. The former received 27*s.* 1*d.* and the latter 26*s.* 1*d.* If we take the whole four series of wage classes, making no allowance for irregularity of work, but including the "average" wages when known, the mean wages come out for the sober 26*s.* 5*d.* and 25*s.* 4*d.* for the drinking section. This is the basis of the statement made in the *Memoir* that the 1*s.* difference shown in the wage results might reasonably be supposed to indicate an employer's preference for sobriety, and did not mark an inferior physique or mentality in the alcoholic section.[9]

Now it appears to me that whereas an equality of wage-value or even a superiority of wage-value—as apart from wage earning—would at any rate tend to strengthen the position taken up by Mr. Keynes and Professor Marshall, the inferiority of the wage-earning power can only tend to invalidate their assertion that the alcoholic section of our Edinburgh population is a differentiated section mentally and physically. They are anxious to demonstrate two points which are largely incompatible: first that the alcoholic section receives lower wages than the sober section, and secondly that it contains physically and mentally superior beings to the sober section, and therefore shows no marked inferiority in offspring. We believe that the two sections are actually parts of one and the same population, which is a fair sample of the *bulk* of the working-class population in Edinburgh; that there is no evidence at all that the drinkers are a better class who have sunk to "low-grade jobs." They follow precisely the same series of trades, and when allowance is made for alcoholic hindrances, appear to have the same or even slightly higher wage-power; when in regular employment they get about 1*s.* less. We were not concerned in our memoir with the influence of alcohol in extreme cases on the comfort of home or on the reduction of wage, we solely used the near equality of wage to indicate that the drinking did not denote a physically and mentally inferior class. Had such an inferiority existed any inferiority in the offspring would have been just as likely to be due to that as to the consumption of alcohol, and the purport of our memoir would have failed. If Mr. Keynes can succeed in showing that the wages of the alcoholic section of the community are for a sober state[10] largely inferior to those of the sober section, then he will not have proved, but he will have taken a first step to proving that the drinking section is mentally and physically inferior and yet produces children not markedly below the grade of the sober section.

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[9] The values given above agree substantially with the values 26*s.* and 25*s.* given for sober and drinker on p. 4 of our original *Memoir*, which Mr. Keynes misquotes in the paragraph I have cited above. The 25*s.* 6*d.* and 25*s.* 5*d.* are the wages when one or other parent drinks and when neither drink, and apply to families with both parents *alive*.

[10] Even in the inebriate reformatories with upwards of 60 per cent. of mentally-defective women, each with an average number of 27 convictions, *i.e.*, in cases of *extreme* alcoholism, 78 per cent. of the women are fit for hard work, and, including the physically unfit, can earn, even under reformatory conditions, 21*l.* per annum per head.

I may, perhaps, be permitted to add one final sentence on this subject. We anticipated many words of abuse from those who pass their lives on the temperance platform giving expression to preconceived notions; our anticipation has been duly fulfilled. We did not expect the tone taken by Professor Marshall or Mr. Keynes in their criticism of our memoir, and if Mr. Keynes thinks I have heaped "much contumely" on him, he should ask some impartial mind for a candid opinion of the tone originally adopted by both Professor Marshall and himself in starting the controversy. When one man speaks of "mathematical outsiders" and the other of "wasting labour" and "culling facts in a hurry" they must not be surprised if the criticised reply with a few hard knocks.

I am, Sirs, &c.,

KARL PEARSON.

January 5, 1911. Eugenics Laboratory,
University of London.

CURRENT NOTES.

The trade returns, both for the month of December, 1910, and for the twelve months ending December, 1910, show largely increased values. For the month there is an increase, as compared with December, 1909, of 8,351,982*l.* on 69,133,150*l.*, or 13·7 per cent., on imports; an increase of 3,634,213*l.* on 37,424,110*l.*, or 10·7 per cent., on exports; and an increase of 241,698*l.* on 9,876,619*l.*, or 2·5 per cent., on re-exports. For the year 1910, as compared with the year 1909, there is an increase of 53,735,216*l.* on 678,440,173*l.*, or 8·6 per cent., on imports; an increase of 52,409,464*l.* on 430,589,811*l.*, or 13·8 per cent., on exports; and an increase of 12,431,285*l.* on 103,776,104*l.* or 13·6 per cent., on re-exports. The following tables show the annual figures in greater detail:—

[000's omitted.]

Exports.	Twelve months ending December, 1910.	Twelve months ending December, 1909.	Increase (+) or Decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	26,114,	23,336,	+ 2,777,
II. Raw materials and articles mainly unmanufactured	53,337,	51,156,	+ 2,181,
III. Articles wholly or mainly manufactured	343,023,	296,758,	+ 46,265,
IV. Miscellaneous and unclassified (including parcel post)	8,116,	6,930,	+ 1,186,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	12,878,	12,000,	+ 878,
II. Raw materials and articles mainly unmanufactured	63,309,	54,398,	+ 8,911,
III. Articles wholly or mainly manufactured	27,354,	24,673,	+ 2,681,
IV. Miscellaneous and unclassified (including parcel post)	235,	274,	− 39,
Total, British, foreign and colonial	534,366,	469,525,	+ 64,840,
Exports of bullion and specie	64,369,	60,035,	+ 4,334,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending December, 1910.	Twelve months ending December, 1909.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	41,616,	40,316,	+ 1,300,
Total, British and foreign, *cleared* with cargoes	57,331,	57,194,	+ 137,

[000's omitted.]

Imports.	Twelve months ending December, 1910.	Twelve months ending December, 1909.	Increase (+) or Decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	257,788,	254,319,	+ 3,469,
II. Raw materials and articles mainly unmanufactured	261,242,	220,145,	+ 41,097,
III. Articles wholly or mainly manufactured	156,856,	147,671,	+ 9,185,
IV. Miscellaneous and unclassified (including parcel post)	2,554,	2,569,	− 15,
Total merchandise	678,440,	624,704,	+ 53,735,
Imports of bullion and specie	71,422,	66,507,	+ 4,915,

Mr. Sauerbeck's index-number of prices for December, 1910, is 77·9, as against 77·8 in November, the average of the eleven years 1867–77 being taken as 100. During the past year the monthly index-number has not shown any important variation. A fall took place in the middle of the year, but a recovery was soon made, and at the end of the year it stood 2 per cent. higher than a year ago. Articles of food are about 1 per cent. lower and materials over 1 per cent. higher than a year ago. The *Economist* index-number stands at 2513, as against 2390 in December, 1909, and 2461 in November, 1910, the movement amounting to a fraction over 2 per cent. in December, and to 5¼ per cent. since last year. Except for the few summer months of 1907, the *Economist* index-number has not been so high since 1890.

According to the Board of Trade *Labour Gazette*, the state of the labour market during November, 1910, was as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
November, 1910	416	680,524	31,276	4·6
October, 1910	416	678,379	30,088	4·4
November, 1909	416	696,415	45,569	6·5

Employment in November was, on the whole, not quite so good as in October. There was an improvement in the cotton and printing trades; on the other hand the building and kindred industries showed a decline. The metal and engineering trades continued to be adversely affected by the dispute in the shipbuilding trade. As compared with a year ago coal mining was about the same and shipbuilding much worse; otherwise, the principal industries, including the cotton trade, showed an improvement.

The January issue of the *Financial Review of Reviews* contains an article by Sir J. Athelstane Baines, C.S.I., on "Our Statistics: a plea for a Central Government Department." The writer reviews the work of the Official Statistics Committee, appointed by Mr. W. H. Smith in 1877, and with regard to its failure he says: "The rock upon which the Committee split, was the "dislocation, so to speak, of the official hierarchy implied in "the proposal that a new and independent body should be "endowed with authority to prescribe, alter or control the statistical "work of existing departments." He then gives instances of marked improvements which have since been introduced, followed by others in which there is still ground for much dissatisfaction. He finds that the defects in our official statistics are traceable mainly to two causes: first, the want of co-operation between departments in regard to the form and detail of their respective returns; and, secondly, the want of machinery responsible for collating the returns from all the different sources and dealing with them in their general, as distinguished from their departmental, significance. "That the "existing state of affairs can be improved," he adds, "there is, of "course, no doubt, but it is only after the most minute inquiry that "the means can be found to introduce an infusion of statistical "method into quarters where the demand of current duties must "interfere with the appreciation at their full value of the returns "there prepared, more especially in their relation to the work being "conducted on corresponding lines elsewhere."

In regard to this inquiry, Sir Athelstane Baines points out that one of the objections raised against the report of 1879 was "that its proposals were not based upon a complete and "impartial survey of the statistical work of the different depart- "ments. The most necessary preliminary step, therefore, must "be to get that work set forth in full explanatory detail, first "by departments, then by subjects, when the latter are dealt "with in more than one office. From this statement can be "learnt not only the scope of each return, but also how far it "supplements or is inconsistent with any other. Its compilation "will be undeniably a very heavy task which must be carried "through by official agency. It would be necessary, too, that the "scrutiny of the forms should be in the hands of experts in "statistical analysis and comparison, and it would be advisable, "therefore, to call in the aid of some non-officials known to be well "versed in social and economic statistics, in order that varied "experience should be brought to bear upon the work of co-"ordination." The writer expressly refrains from specifying the authority which should prescribe the proposed changes and see that they are carried out. For the next stage "when the returns of most "of the departments ought to be incorporated in a wider survey in "order that their full statistical value may be disclosed," he proposes a central organisation, supplemented or not by a consultative body of experts. The hands of the higher officials are already full, and every year brings additional responsibilities to the departments. Such statistics as Sir Athelstane Baines has in view cannot, he says, be the bye-product of routine, but must occupy the undivided attention of a specialised staff. The representations of economists and statisticians for years past for the establishment of such an office have failed, and "the refusal does not rest merely upon the "stereotyped financial ground that 'it does not appear that the "'new establishment will result either in saving or in profit com-"'mensurate with its cost.' But there seems to be also an under-"current of apprehension lest it be found exceedingly difficult to "establish the relations between such an office and existing "departments on lines which would not engender perpetual "friction." Sir Athelstane Baines, while recognising that the task "would doubtless be delicate and probably invidious" thinks its achievement possible, and reminds his readers that "many more "unpalatable administrative changes have been effected as soon as "statesmen thought it worth their while to insist upon them." The article concludes, however, with the intimation that this contingency is still below the horizon. "The outline I have given "may be found interesting, if not useful, if it chance to fall into "the hands of some one called upon to comment upon the same "shortcomings and remedies—a century hence."

The United States Immigration Commission have issued a partial or preliminary report on "Changes in bodily form of descendants "of Immigrants" which is of interest in connection with the question of the influence of environment. Shortly after the commencement of the Commission's work, the possibility of getting an accurate test of the influence of the American environment upon immigrants and their descendants was considered, and it was thought that if careful measurements of the bodies of European immigrants and of their descendants at different ages and in different circumstances were made, valuable results might be reached. Professor Franz Boas was accordingly invited to direct such an investigation and was put in general charge. The results now published must be regarded as tentative, for the numbers are at present small and the data refer to East European Hebrews and to Sicilian immigrants only, but they suggest conclusions of the most far-reaching kind. In brief the results are these: the children of immigrants born after the parents' arrival in the States differ appreciably in most of the measurements noted from those born before the parents' arrival, and the differences appear slightly to increase with the duration of the parents' stay in the new country. In stature and in weight the American-born children of the east European Hebrews exceed the foreign-born children of such immigrants: the children of the Sicilians on the other hand show no such favourable influence, but rather a small loss in vigour. As regards head-index, which has been regarded by many anthropologists as a particularly stable character, little affected by environment, the American-born children of the Hebrews show a decrease, the American-born children of Sicilians an increase—the two tending, it would seem, to converge towards a common mean. "This fact," writes Professor Boas, "is one of the most suggestive "ones discovered in our investigation, because it shows that not "even those characteristics of a race which have proved to be most "permanent in their old homes remain the same under our new "surroundings; and we are compelled to conclude that when these "features of the body change, the whole bodily and mental make-up "of the immigrants may change." A possible source of fallacy lies in the fact that the type of immigrant has been undergoing a steady change of recent years, but a comparison of the American-born and the foreign-born children with their own parents, instead of in the aggregate, confirms the result. As an illustration, we give an extract from the tables respecting the height, weight and head-index of the sons of East European Hebrews, age 12: F stands for "foreign-born," A for "American-born." The means and standard-deviations given at the foot of the table are both taken from the original report. All the differences are well in excess of the probable error, the excess being greatest in the case of the head-index.

Stature.			Weight.			Head-index.		
Centimetres.	F.	A.	Kilogrammes.	F.	A.	—	F.	A.
120—1	—	1	22—3	—	1	73	—	1
122—3	—	1	24—5	1	12	74	1	2
124—5	1	3	26—7	12	41	75	—	1
126—7	4	3	28—9	15	39	76	—	7
128—9	7	7	30—1	22	53	77	1	7
130—1	5	17	32—3	18	57	78	1	20
132—3	13	33	34—5	15	48	79	1	20
134—5	12	30	36—7	7	32	80	8	40
136—7	18	33	38—9	3	22	81	7	54
138—9	23	30	40—1	4	13	82	10	53
140—1	16	56	42—3	1	12	83	22	53
142—3	14	41	44—5	1	4	84	15	41
144—5	7	36	46—7	1	1	85	16	41
146—7	3	29	48—9	1	3	86	13	22
148—9	3	20	50—1	—	1	87	11	8
150—1	2	17	52—3	—	1	88	13	7
152—3	2	8	54—5	—	1	89	7	9
154—5	3	9	56—7	—	2	90	5	—
156—7	—	1	58—9	—	—	91	1	2
158—9	—	3	60—1	—	—	92	1	—
160—1	—	1	62—3	—	—	93	—	—
162—3	—	1	64—5	—	—	94	—	—
Total	133	380	—	101	343	—	133	388
Mean	138·1	140·6	—	32·3	33·1	—	84·6	82·3
δ	6·1	6·9	—	4·5	5·4	—	3·1	3·0

The issue of the *Journal de la Société de Statistique de Paris* for December last contains, *inter alia*, an essay by M. Lucien March "Sur un mode d'exposer les principaux éléments de la "théorie statistique." Commencing with the subject of averages, M. March proceeds to discuss variability, including under this head both measures of dispersion and the theory of frequency curves, and concludes with a third section on covariation (correlation). It is impossible within the limits of a note to indicate the lines on which he develops his subject—we must refer those interested to the original—but it may be mentioned that the essay is controlled throughout by the idea expressed by Monsieur March in a previous paper (*vide* the same journal for September, 1908) viz., that the word "probability" should be avoided in statistical theory, and the rules of that theory should not be borrowed from the theory of probability. "The positive part of the theory of "statistics considers certain series of events, relations, sequences, or "frequencies. On such data, when suitable measures have been "applied, we can found reasons for believing in certain possible "consequences. But these reasons are nearly always insufficient: "other reasons—based on qualitative data or on plausible

" hypotheses—must intervene, and such reasons are hardly " susceptible of measurement."

We have received from Dr. Jacques Bertillon a copy of his report (reprinted from the *Revue Internationale de Sociologie*) on the causes of the fall of the birth-rate in France and the remedies therefor. The report is one presented to the Sub-committee on Natality of the Committee on Depopulation. Starting from the fact that absolutely sterile marriages do not appear to be more frequent in France than in other countries, it is argued that the fall in fertility cannot be due to physiological causes, but must be due to the desire of parents to limit the size of their families. This view is borne out by the relation observed between the social character of a district and the ratio of births to women of fertile age, and even more directly by the greater number and greater value of estates passing by death in the case of small, as compared with large families. Some possible remedies for the existing state of affairs —alterations of the laws respecting succession, marriage and divorce, a lightening of the burden of taxation on large families and the according of special privileges to such families, *e.g.*, the reservation of employment in the public services and certain favours in the case of military service—are discussed in the second part of the report. " The fall in the French birth-rate will not cease and will end in " the destruction of the nation," the Committee conclude, " if an " attempt is not made, by every rational means, to lessen the " opposition which exists between the interests of the individual " and the interests of the species. The legislator should never " deviate from this standpoint. The duty of bringing up children " should be regarded as a form of taxation. To pay a tax is, in " fact, to make a pecuniary sacrifice for the good of the nation. " The family that brings up children does the same."

In a paper on the variability of the two sexes, published in the *Studi Economico-giuridici* of the University of Cagliari, Professor Corrado Gini raises the question of the proper method of measuring variability in such a case. Professor Pearson suggested that the standard-deviation might be misleading, as we would hardly expect the same actual dispersion in the case of the male as in the case of the female, with her smaller mean measurements. He proposed, accordingly, to use the ratio of the standard-deviation to the mean (the co-efficient of variation) as a measure of relative dispersion, and other writers have made suggestions to the same effect. But, argues Professor Gini, the standard-deviation of the sum of n independent variables of the same dispersion is proportional not to n but to the square-root of n, while the mean of the sum (if the means of the elements are equal) is proportional to n itself. Hence, if we may assume any dimension of the human body to be compounded of a number of such elements—the difference between the two sexes being due to a difference in the number and not in the mean size of the element—the ratio of the standard-deviation to the square-root of the mean should be taken as an index of "relative variability," for the ratio of these indices for the two sexes measures the ratio of the dispersions of the elements. The index in question Professor Gini calculates for a number of different series of data, some original and some cited from Professor Pearson, and concludes that males are not more variable, in this sense of the term, than females, except at birth. The hypothesis on which the proposed measure is founded seems original and worth discussion, but a little artificial: it is surely more natural to suppose that, for any given dimension, the number of the elements is the same for the two sexes but their average dimensions differ.

The Carnegie Foundation have issued a report by Mr. M. L. Cooke, member of the American Society of Mechanical Engineers, on "Academic and Industrial Efficiency," *i.e.*, on the efficiency of certain American institutions for higher education, so far as regards their physics departments at least, from the standpoint of a man of business. "The college is partly a business, and partly something very "different from a business," as stated in the preface, and "Mr. Cooke is concerned only with the former aspect. It will be "interesting for those to whom the latter view-point is more natural "to consider how far his observations have suggestive significance." Part I consists of the text of Mr. Cooke's report, and in Part II is given an extensive series of statistical tables illustrating and supporting his conclusions. These conclusions seem to us of great importance and of very general application. The report indicates "the general lack of intensiveness which one finds everywhere "pervading the universities and colleges"; the great variety in type of organisation; the want of any gauge of efficiency; the diversity of conditions of work, of the treatment of research and the sums spent thereon; the difficulty of a man whose abilities lie in teaching rather than in research acquiring a reputation at all commensurate with his abilities; the inefficient use made of rooms—frequently only some three hours a day—and similar matters. On the important question of "inbreeding" of teachers, *i.e.*, the tendency of an institution to the exclusive employment of its own students as teachers, the following data are of interest:—Percentage of staff entirely home-bred, Columbia 6, Harvard 39, Massachusetts

Institute of Technology 100, Princeton 13, Toronto 64, Wisconsin 23. "It would seem," writes Mr. Cooke, and we cordially agree, "that either an extremely high percentage or an extremely low "percentage of teachers drawn from the school at which they teach "is bad practice. There was one marked instance (perhaps two) "where the department of physics seemed to lack solidarity on "account of the large number of teachers drawn from other institutions." If, on the other hand, too large a proportion of teachers be drawn from the students of the same institution, the instruction may tend to become too narrow both in style and scope.

Courses of instruction in statistics are at present held at so few centres in the United Kingdom that the commencement, on the 13th inst., of a course of twelve lectures by Mr. G. H. Wood, at the Technical College, Huddersfield, may be noted with satisfaction. The lectures will deal with methods of collection and tabulation of statistics; methods of statistical analysis; comparison of groups and series; index-numbers; and charts and diagrams. Illustrations will be drawn from statistics of exports and imports, shipping, production, banking, pauperism, prices, wages, unemployment, trades-unions, co-operation, physical condition of school children, lunacy, births, marriages, disease and deaths.

It is announced that the Stockholm Municipal Bureau of Statistics ("Stockholms stads Statistika Kontor"), hitherto designated for international purposes "Bureau de statistique de la ville "de Stockholm," will in future be known as "Service Municipale "de Stockholm." Some confusion has been caused in the past owing to a similarity of designations, and it is desired that all correspondence should now be addressed in accordance with the above change.

The appointment of Mr. A. W. Flux as Director of the Census of Production at the Board of Trade is announced. Mr. Thomas Butler has been appointed Superintendent of the Statistics and Intelligence Branch of the Department of Agriculture and Technical Instruction of Ireland *vice* Mr. W. G. S. Adams, resigned.

The New Year's list of Honours contained the names of three Fellows of this Society, and we are glad to congratulate Sir R. F. Crawford, K.C.M.G., Sir G. L. Gomme, and Mr. G. H. Knibbs, Commonwealth Statistician of Australia, C.M.G. Sir Richard Crawford was for some years a member of Council, and has read two papers before the Society.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

- *The Accountant*, 1910—
  - *December* 3—The Public Trustee and his work.
  - *December* 10—The Sale of Goods Act: *Wilson* (*Horace*).
  - *December* 17—The Local Government Board and local taxation in England and Wales.
  - *December* 24—Bankruptcy reform: *Fyfe* (*T. A.*).
- *Accountants' Magazine. December*, 1910—The history of the income-tax: *Bell* (*L. B.*).
- *Bankers' Magazine*—
  - *December*, 1910—Land banks in France. Scheme for the creation of a national gold reserve. A reply to Mr. Edgar Crammond. The Union Bank of Scotland, Ltd. The American banker's convention.
  - *January*, 1911—The progress of banking in Great Britain and Ireland during 1910. No. 1. Capital and reserve funds. Banker's superannuation and pension funds. United States banking and currency: *Murray* (*Reg.*).
- *Economic Journal. December*, 1910—Economic security and unemployment insurance: *Smith* (*Sir H. Llewellyn*). Statistical measurement of profit: *Ashley* (*Prof. W. J.*). On financiers' profits: *Lehfeldt* (*R. A.*). Municipal socialism: *Cohn* (*Prof. G.*). Poverty figures: *Macgregor* (*Prof. D. H.*). Economic transition in India: *Dodwell* (*D. H.*). French railway servants and their pensions: *Bellet* (*D.*). German factory hands: *Lesser* (*E.*). Method of determining numerical value: *Pigou* (*Prof. A. C.*). Letter from Japan: *Soyeda* (*J.*). Recent congresses: *Gide* (*Prof. C.*).
- *Financial Review of Reviews*—
  - *December*, 1910—The financial outlook of Australia: *Reid* (*The Rt. Hon. Sir George*, P.C., K.C.). The probable future of investment: *Hobson* (*J. A.*). America and American investments: *Cousins* (*Arthur G.*).
  - *January*, 1911—The rudiments of sound investment: *Lowenfeld* (*Henry*). Our statistics: a plea for a Central Government Department: *Baines* (*Sir J. A.*, C.S.I.). Where speculation breaks down and investment succeeds: *Chatterton* (*E. Keble*).
- *Journal of the Board of Agriculture. December*, 1910—The railway transport of agricultural produce: *Lissenden* (*Geo. B.*). The commercial growing of sugar beet in Norfolk: *Sayer* (*Walter E.*).

UNITED KINGDOM—*Contd.*

Journal of the Institute of Bankers—

December, 1910—The President's Inaugural Address. International conference on bills of exchange: report of the British delegates. A plea for a united effort to standardise application, allotment and call forms: *Hepburn* (*P. F.*). Loans issued during the year.

January, 1911—On valuation for mortgage of real property: *Martin* (*Howard*). Overdrafts of local authorities.

United Empire: The Royal Colonial Institute Journal—

December, 1910—The imperial problem: *Marlborough* (*The Duke of*). A British sea-power in the Pacific: New Zealand's mercantile marine: *Scholefield* (*Guy H.*). The Georgian Bay ship canal: *Colquhoun* (*Archibald R.*).

January, 1911—The necessity for an imperial parliament: *Edwards* (*Lieut.-Gen. Sir J. Bevan*). Colonial education in Germany: *Hamilton* (*Louis*).

UNITED STATES—

American Journal of Sociology. November, 1910—Chicago's housing problem: families in furnished rooms: *Breckinridge* (*S. P.*) and *Abbott* (*Edith*). The transition to an objective standard of social control: *Bernard* (*L. L.*). The influence of newspaper presentations upon the growth of crime and other anti-social activity: *Fenton* (*Frances*).

American Statistical Association. Quarterly Publications. No. 91. *September*, 1910—International crop-reporting service: *Clark* (*C. C.*). Railway statistics: *Haney* (*Lewis H.*). Referenda in Massachusetts and Boston: *Hartwell* (*Edward M.*).

Bankers' Magazine (*New York*). *December*, 1910—Adjusting branch bank finances: *Eckardt* (*H. M. P.*).

Bulletin of the Bureau of Labor. No. 89. *July*, 1910—Child-labor legislation in Europe: *Veditz* (*C. W. A.*).

Journal of Political Economy, 1910—

November—The world entrepôt: *Smith* (*J. Russell*). The economics of Henry George's "Progress and Poverty": *Johnson* (*Edgar H.*). The Forth and Clyde ship canal: *Moulton* (*H. G.*).

December—Banknotes and lending power: *Laughlin* (*J. Laurence*). Making a tariff law: *Evans* (*Samuel M.*). The shirtwaist trade: *Goodman* (*Pearl*) and *Ueland* (*Elsa*).

Yale Review. November, 1910—The religious question in Spain: *Guijarro* (*L. G.*). The problem of sick and accident insurance in Switzerland: *Jenny* (*O. H.*). Work, accidents, and the law: *Cheney* (*H.*). Economic phases of the railroad rate controversy: *Sakolski* (*A. M.*). The statistical work of the Federal Government: *Parmelee* (*J. H.*).

AUSTRIA—

Statistische Monatschrift, 1910—

October—Die Ausgedingeinstitution: *Forcher* (*Dr. Hugo*). Die Einwanderung nach Südamerika: *Englisch* (*Dr. v.*). Die vorläufigen Ergebnisse der Bewegung der Bevölkerung in Österreich im Jahre 1909.

November-December—Das finanzpolitische Prinzip der Beweglichkeit im österreichischen direkten Steuersysteme: *Vogel* (*Dr. E. H.*). Die ungarische Volkszählung vom 31 Dezember, 1900: *Hecke* (*Dr. Wilhelm*). Die XII. Session des Internationalen Statistischen Institutes zu Paris: *Haan* (*Hugo Freih. v.*). Zur Frage der Häusernumerierung: *Kumaniecki* (*Dr. Kasimir L.*). Anbau und Ernte der wichtigsten Körnerfrüchte im Jahre 1910. Vorläufige Ergebnisse.

FRANCE—

Annales des Sciences Politiques. November, 1910—Le rachât des chemins de fer au Japon: *Lévy* (*Maurice*). La politique douanière de l'Empire allemand. II. Le prince de Bülow et le tarif du 25 décembre 1902: *Armagnac* (*J.*) and *Saint Girons* (*P.*). Auguste von der Heydt, ministre du commerce et des finances de Prusse (1801-74): *Raffalovich* (*A.*). Chronique internationale. (1909): *Gidel* (*Gilbert*). Chronique coloniale. (1909): *Vauchassade de Chaumont* (*Georges*).

Bulletin de Statistique, Ministère des Finances. October, 1910—Le projet de budget rectifié pour 1911. Le commerce extérieur en 1909. La situation financière des départements en 1906. Le mouvement des chèques français d'après les produits de l'impôt. Les revenus de l'État.

Journal des Economistes. December, 1910—Faits et prévisions: *Guyot* (*Yves*). La production capitaliste et l'anarchie internationale: *Novicow* (*J.*). Le crédit agricole: *Bernard* (*François*). La situation des chemins de fer fédéraux en Suisse: *Favarger* (*Ph.*). Études américaines: le Congrès annuel des banquiers américains: *Raffalovich* (*Arthur*). Revue de l'Académie des sciences morales et politiques (du 15 août au 15 novembre 1910): *Lefort* (*J.*). Travaux des chambres de commerce: *Rouxel*. Mouvement scientifique et industriel: *Bellet* (*Daniel*). Lettre des États-Unis: *Tricoche* (*George N.*). La grève générale: *Passy* (*Frédéric*).

Journal de la Société de Statistique de Paris. December, 1910—Recherche d'une méthode rationnelle de représentation proportionnelle: *Roulleau* (*M. G.*). Essai sur un mode d'exposer les principaux éléments de la théorie statistique: *March* (*M. L.*). Chronique des questions ouvrières et des assurances sur la vie: *Bellom* (*Maurice*).

La Réforme Sociale—

November 16, 1910—Proudhon et ses doctrines sur la propriété: *Clément* (*Henry*). La placement et le chômage: *Olphe-Galliard* (*G.*). De quelques améliorations possibles à la loi du 15 Février 1902 sur la protection de la santé publique: *Risler* (*Georges*). L'accroissement du divorce dans les classes populaires: *Nourrisson* (*Paul*).

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La Réforme Sociale—Contd.

December 1, 1910—La législation ouvrière en Australasie : *Hubert-Valleroux* (*M.*). Les coopératives d'achats en gros entre petits commerçants et petits industriels : *Clercq* (*Victor de*). L'expropriation pour cause d'insalubrité : une loi nécessaire : *Risler* (*G.*) L'Office belge des métiers et négoces (*continued in next issue, December* 16) : *Royer de Dour* (*Baron de*).

December 16, 1910—Les écoles techniques et de perfectionnement en France et à l'étranger : *Blondel* (*Georges*). Ce que voulaient les cheminots : pourquoi ils n'ont rien obtenu : *N.* (*F. M.*). Le rôle des consommateurs vis-à-vis du petit commerce : *Bergeron* (*J.*). Les ateliers coopératifs d'artisans (*continued in issue of January* 1, 1911) : *Barrat* (*M.*).

January 1, 1911—Un essai d'aide sociale à la famille ouvrière dans le quartier de Plaisance : *Chaptal* (*Mademoiselle*). L'accession aux emplois publics avant et depuis la révolution : *Cilleuls* (*Alfred des*). Ateliers de famille et petite industrie à domicile : *Georges-Picot* (*R.*).

Revue d'Économie Politique. November-December, 1910—Une théorie négligée : *Landry* (*Adolphe*). Le socialisme municipal en France: *Nézard* (*Henri*). Le projet d'impôt sur le revenu : *Lavergne* (*A. de*) et *Henry* (*Paul*). Concurrence : lutte pour la vie ou liberté économique ? *Raynaud* (*B.*).

GERMANY—

Archiv für Rassen- und Gesellschafts-Biologie. September-October, 1910—Beiträge zum Bevölkerungsproblem unserer tropischen Kolonien : *Külz* (*Dr.*). Kulturelle Entwicklung und Absterbeordnung : *Prinzing* (*Dr. F.*). Hundert Fehlgeburten ihre Ursachen und Folgen : *Weissenberg* (*Dr. S.*). Der verschiedene Widerstand der Geschlechter gegen die Entartung : *Velden* (*Dr. F. von den*).

Deutsches Statistisches Zentralblatt. November, 1910—Die amtliche Statistik auf der Allgemeinen Städtebau-Ausstellung in Berlin im Jahre 1910 : *Kuczynski* (*Dr. R.*).

Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft (*Schmoller's*). *Heft* 4, 1910—Die ständischen Elemente in der ungarischen Politik : *Garr* (*Max*). Tunesien, seine heutige Verfassung und Verwaltung : *Rathgen* (*B.*). Montesquieu als Staatsmann. (Nach einer bisher unbekannten Denkschrift an den Herzog von Orleans.) : *Mann* (*Fritz Karl*). Sinn und Wert des Marxismus. II. : *Jäger* (*Georg*). Der Streit um die Steuerhinterziehungen in Preussen : *Behrnauer* (*F.*). Verrufe. I. : *Dehn* (*Paul*). Der Organisationsvertrag im deutschen Buchdruckgewerbe : *Hinke* (*Hans*). Die Bewegung der Kaufpreise für landliche Besitzungen und die Entwicklung der Getreidepreise im Königreich Preussen von 1895 bis 1909 : *Rothkegel* (*Walter*). Die wirtschaftliche Bedeutung des modernen Pflanzenbaues : *Wygodzinski* (*W.*). Das bäuerliche Erbrecht des neuen schweizerischen Zivilgesetzbuches : *Rudloff* (*Hans L.*). Die westdeutsche Eisenindustrie und die Moselkanalisie-

GERMANY—*Contd.*

Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft—Contd. rung. II.: *Schumacher* (*Hermann*). Zum Problem gesetzlicher Aufnahme der Barzahlungen im Österreich-Ungarn: I. Ein Schlusswort gegenüber-Walther Jedern: *Mises* (*L.*). II. Gesetzliche Barzahlung und Kreigsfall: *Neurath* (*Otto*).

Jahrbücher für Nationalökonomie und Statistik (*Conrad's*), 1910—

November—Die Bankenquete und die Depositenfrage: *Lexis* (*W.*). Das französische Altersversicherungsgesetz vom 5 April 1910: *Rudloff* (*Hans L.*). Beiträge zur Kenntnis des Geschlechtsverhältnisse der Geborenen: *Furlau* (*V.*). Der Rückgang der Schiffahrt in den Vereinigten Staaten: *Schultze-Grossborstel* (*Ernst*). Die ersten statistischen Erhebungen über die Gesundheitsverhältnisse, der männlichen und weiblichen Erwerbstätigen: *Gottberg* (*M. Von*). Politik und Wahlrecht in Neuseeland: *Goldschmidt* (*A.*). Das soziale und wirtschaftliche Element in der elsass-lothringischen Frage: *Kreuzkam.*

December—Berufliche und soziale Gliederung im Deutschen Reiche: *Hesse* (*Albert*). Die finanziellen Ergebnisse der deutschen Maschinenbau-Aktiengesellschaften im Jahre 1909: *Werner* (*Ernst*). Die Entwicklung der englischen Trade-Boards (Gewerkämter): *Dyhrenfurth* (*G.*). Arbeit starifverträge in der Holzindustrie: *Schildbach* (*Bernhard*).

Vierteljahrshefte zur Statistik des Deutschen Reichs, 1910. *Heft* 4—Hopfenanbau und Schätzung der Hopfenernte 1910. Zur deutschen Justizstatistik 1908. Die Bergwerke, Salinen und Hütten 1909. Eheschliessungen, Geburten und Sterbefälle 1909. Die jugendlichen Fabrikarbeiter und die Fabrikarbeiterinnen 1909. Ergebnisse des Heeres-Ergänzungsgeschäfts 1909. Die Schulbildung der Rekruten 1909. Zur Kriminalstatistik. Vorläufige Mitteilung für 1909. Verbrechen und Vergehen gegen Reichsgesetze 1903-08. Salzgewinnung und Besteuerung 1909. Die öffentlichen und nicht öffentlichen Sparkassen im Deutschen Reiche 1908. Bierbrauerei und Bierbesteuerung 1909. Zuckergewinnung und Besteuerung 1909-10.

Zeitschrift des Königlich Preussischen Statistischen Landesamts, 1910. *Abteilung* 3—Monats- und Jahrespreise wichtiger Lebens- und Verpflegungsmittel in 50 preussischen Berichtsorten im Jahre 1909: *Kühnert* (*Prof. Dr. F.*). Die preussischen Sparkassen im Rechnungsjahre 1908: *Evert* (*G.*). Die Geburten, Eheschliessungen und Sterbefälle im preussischen Staate während des Jahres 1909. Statistische Korrespondenz.

Zeitschrift für Socialwissenschaft—

Heft 11, 1910—Der Kapitalismus im griechisch-römischen Ägypten (*continued in next issue, Heft* 12): *Pringsheim* (*O.*) Die Lausanner Schule der politischen Ökonomie (*continued in next issue, Heft* 12): *Heber* (*E. A.*). Krankheits- und Sterblichkeitsverhältnisse nach dem Beruf in Leipzig. II: *Prinzing* (*F.*). Volksvermehrung und Volksverminderung bei den Naturvölkern und ihre Ursachen. II (*continued in next issue, Heft* 12): (*Berkusky, J.*).

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Zeitschrift für Socialwissenschaft—Contd.

Heft 1, 1911—Wirtschaft und Recht: *Voigt* (*A.*). Ist Montesquieu ein Anhänger der Lehre von der Volkssouveränität? *Hasbach* (*W.*). Das "Rabattsystem" der Verbände in der Seeschiffahrt: *Passow* (*R.*). Gesetzes-Überproduktion in den Vereinigten Staaten: *Schultze* (*E.*).

ITALY—

Rivista Italiana di Sociologia. September-December, 1910—L'avvenire della razza: *Steinmetz* (*S. R.*). Sui limiti del campo d'osservazione della demografia: *Fornasari di Verce* (*E.*). Psicosi, nevrosi e criminalità: *Consiglio* (*P.*).

LIST OF ADDITIONS TO THE LIBRARY.

During the month ended January 7, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Austria—

Labour. Die kollektiven Arbeits- und Lohnverträge in Österreich Abschlüsse und Erneuerungen des Jahres 1908. 8vo. 1910. (The Austrian Labour Department.)

Railways. Die Österreichischen Staatsbahnen seit dem Bestande des Eisenbahnministeriums, 1896-1908. 8vo. 1910. (The Ministry of Railways.)

Vienna. Bericht des Wiener Stadtphysikates über seine Amtstätigkeit und über die Gesundheitsverhältnisse der k.k. Reichshaupt und Residenzstadt Wien, in den Jahren 1903-1906. 8vo. 1910. (The Medical Officer of Health.)

Belgium—

Antwerp. Bureau du travail des œuvres sociales et de statistique. Le chômage à Anvers en 1908-09. Secours. 4to. 1910. (The Registrar-General of England.)

Liege. Comité de patronage des habitations ouvrières et des institutions de prévoyance. Rapports sur les opérations du Comité pendant 1899 et 1902. 2 parts, 8vo. 1900-03. (M. Wille.)

France—

Census. Répertoire technologique des noms d'industries et de professions. Français, Anglais, Allemands; avec notices descriptives sommaires suivi de trois listes alphabétiques des noms allemands, anglais et francais. La. 8vo. 1909. (Messrs. Berger-Levrault and Co.)

Colonies. Statistiques décennales du commerce des Colonies françaises (1896-1905). Tome 1. Statistiques générales et statistiques par Colonies. 4to. 1910. (The French Colonial Office.)

Germany—

Dusseldorf. Mitteilungen zur Statistik der Stadt Düsseldorf. Nr. 7. Das Statistische Amt der Stadt 1900 bis 1910. 11 pp., 4to. 1910. (The Statistical Bureau).

Hamburg. Statistik des Hamburgischen Staates. Heft 25. Grundstucke, Wohnungen, Geschaftsraume. Mieten und Haushaltungen (Volkszählung 1905. Teil 3) nebst Ergebnissen der Grundstucksaufnahmen der Jahre 1906 bis 1909. 4to. 1910. (*Id.*)

Verein für Sozialpolitik—

- Auslese und Anpassung der Arbeiterschaft in der Elektroindustrie, Buchdruckerei, Feinmechanik und Maschinenindustrie . . . 8vo. 1910. (Purchased.)
- Auslese und Anpassung der Arbeiterschaft der geschlossenen Grossindustrie. Dargestellt an den Verhältnissen der "Gladbacher Spinnerei und Weberei" . . . 8vo. 1910. (*Id.*)

Italy—

Emigration. Statistica della emigrazione italiana per l'estero negli anni 1908 e 1909, con una appendice di confronti internazionali. 8vo. 1910. (The Director-General of Statistics.)

Labour. Notizie sulle variazioni del salari e degli orari nell' industria serica italiana dal 1901 al 1907. Fol. 1908. (The Ministry of Agriculture and Commerce.)

(a) **Foreign Countries**—*Contd.*

Netherlands—

Amsterdam. Communications statistiques du Bureau municipal de statistique. No. 30 L'impôt municipal sur le revenu pendant 1905-07. 8vo. 1910. (The Registrar-General of England.)

Norway—

Statistique industrielle pour 1906-07, éditée par l'Office des Assurances de l'État. 8vo. 1910. (The Office.)

Portugal—

Provincia de Moçambique. Estadistica dos Rendimentos da Provincia, annos de 1897-98 a 1906-07. Oblong fol. 1908. (The Director-General of Statistics.)

United States—

Census Bureau. Special Reports. Mortality Statistics, 1900 to 1904. 4to. 1906. (The Bureau of the Census.)

—— Special Reports. Telephones: 1907. 4to. 1910. (*Id.*)

Immigration Commission. Changes in Bodily Form of Descendants of Immigrants. (Senate Document No. 208.) 8vo. 1910. (The Commission.)

National Monetary Commission. Publications—

I. Miscellaneous. Address by Senator Aldrich before the Economic Club of New York, November 29, 1909, on the Work of the Commission. No. 406. 8vo. 1910. (The Commission.)

—— Interviews on Banking and Currency Systems of England, Scotland, France, Germany, Switzerland and Italy, under direction of Hon. Nelson W. Aldrich. No. 405. 8vo. 1910. (*Id.*)

—— Statistics for Great Britain, Germany and France, 1867-1909. No. 578. 4to. 1910. (*Id.*)

—— Report to National Monetary Commission on Fiscal Systems of United States, England, France and Germany. No. 403. 8vo. 1910. (*Id.*)

—— Discount System in Europe. By Paul M. Warburg. No. 402. 8vo. 1910. (*Id.*)

—— Bank acceptances. By Lawrence Merton Jacobs. No. 569. 8vo. 1910. (*Id.*)

II. United States. Statistics for the United States, 1867-1909. Compiled by A. Piatt Andrew. No. 570. 4to. 1910. (*Id.*)

—— Special Report from Banks of United States. April 28, 1909. No. 225. 4to. 1910. (*Id.*)

—— Laws of United States concerning Money, Banking, and Loans, 1778-1909. Compiled by A. T. Huntington and Robert J. Mawhinney. No. 580. 8vo. 1910. (*Id.*)

—— Digest of State Banking Statutes. Compiled by Samuel A. Welldon. No. 353. 8vo. 1910. (*Id.*)

—— The First and Second Banks of the United States, by John Thom Holdsworth, Ph.D., and Davis R. Dewey, Ph.D. No. 571. 8vo. 1910. (*Id.*)

—— State Banking before the Civil War, by Davis R. Dewey, Ph.D., and the Safety Fund Banking System in New York, 1829-1866, by Robert E. Chaddock, Ph.D. No. 581. 8vo. 1910. (*Id.*)

—— Origin of National Banking System, by Andrew McFarland Davis. No. 582. 8vo. 1910. (*Id.*)

—— History of Crises under the National Banking System, by O. M. W. Sprague. No. 538. 8vo. 1910. (*Id.*)

—— Use of Credit Instruments in Payments in the United States. Report compiled by David Kinley, Ph.D., LL.D. No. 399. 8vo. 1910. (*Id.*)

—— Clearing Houses, by James Graham Cannon. No. 491. 8vo. 1910. (*Id.*)

(a) **Foreign Countries**—*Contd.*

United States—*Contd.*

—— Suggested Changes in Administrative Features of National Banking Laws. Replies to circular letter of inquiry of September 26, 1908, and Hearings, December 2 and 3, 1908. No. 404. 8vo. 1910. (The Commission.)

—— History of National-Bank Currency. By Alexander Dana Noyes. No. 572. 8vo. 1910. (*Id.*)

III. Canada. History of Banking in Canada. By Roeliff Morton Breckenridge. No. 332. 8vo. 1910. (*Id.*)

—— Canadian Banking System. By Joseph French Johnson. No. 583. 8vo. 1910. (*Id.*)

IV. England. The English Banking System. By Hartley Withers, Sir R. H. Inglis Palgrave, and other writers. No. 492. 8vo. 1910 (*Id.*)

V. France. Evolution of Credit and Banks in France from the founding of the Bank of France to the present time. By André Liesse. No. 522. 8vo. 1909. (*Id.*)

—— The Bank of France in its Relation to National and International Credit, by Maurice Patron, and an article upon French Savings by Alfred Neymarck. No. 494. 8vo. 1910. (*Id.*)

—— History and Methods of the Paris Bourse, by E. Vidal. No. 573. 8vo. 1910. (*Id.*)

VI. Germany. The Reichsbank, 1876-1900. No. 408. 8vo. 1910. (*Id.*)

—— German Imperial Banking Laws, edited by Dr. R. Koch, with the German Stock Exchange Regulations. No. 574. 8vo. 1910. (*Id.*)

—— Miscellaneous articles on German Banking. No. 508. 8vo. 1910. (*Id.*)

—— German Bank Inquiry of 1908. Stenographic Reports. Proceedings of the entire Commission. Points 1 to 5 of the Question Sheet. No. 407. 8vo. 1910. (*Id.*)

—— Renewal of Reichsbank Charter. No. 507. 8vo. 1910. (*Id.*)

VII. Switzerland. The Swiss Banking Law. Study and criticism of the Swiss legislation respecting Banks of Issue, and especially of the Federal Act of October 6, 1905, concerning the Swiss National Bank. By Dr. Julius Landmann. No. 401. 8vo. 1910. (*Id.*)

IX. Sweden. The Swedish Banking System. By A. W. Flux. No. 576. 8vo. 1910. (*Id.*)

X. Belgium. The National Bank of Belgium. By Charles A. Conant. No. 400. 8vo. 1910. (*Id.*)

XI. Mexico. The Banking System of Mexico. By Charles A. Conant. No. 493. 8vo. 1910. (*Id.*)

—— Financial Diagrams compiled by A. Piatt Andrew. No. 509. La. fol. 1910. (*Id.*)

Carnegie Foundation for Advancement of Teaching. Academic and Industrial Efficiency. Bulletin No. 5, 1910. 8vo. 1910. (The Foundation.)

Johns Hopkins University. Studies in Historical and Political Science. The Doctrine of Non-Suability of the State in the United States. By Karl Singewald, Ph.D. 8vo. 1910. (The Johns Hopkins University Press.)

(b) **India and Colonies.**

India, British—

Bengal. District Gazetteers. Birbhum, Singhbhum, Saraikela, and Kharsawan. 2 vols., 8vo. 1910. (The Secretary of State for India.)

Central Provinces. District Gazetteer. Raipur District. Vol. A. Descriptive. 8vo. 1909. (*Id.*)

Punjab—

District Gazetteers. Vol. 32 A. Jhang District. 1908. 8vo. 1910. (*Id.*)

—— Vol. 34 A. Muzaffargarh District. 1908. 8vo. 1910. (*Id.*)

States Gazetteer. Vol. 22 A. Chamba State. 1904. 8vo. 1910. (*Id.*)

Sind. Gazetteer of the Province of Sind. 8vo. 1907. (*Id.*)

(b) India and Colonies—*Contd.*

United Provinces of Agra and Oudh—

Cawnpore. A Gazetteer, being Vol. 19 of District Gazetteers. 8vo. 1909. (The Secretary of State for India.)

Hamirpur. A Gazetteer, being Vol. 22 of District Gazetteers. 8vo. 1909. (*Id.*)

Jalaun. A Gazetteer, being Vol. 25 of District Gazetteers. 8vo. 1909. (*Id.*)

(c) United Kingdom and its several Divisions.

United Kingdom—

Elections. Return, Parliamentary Elections (Expenses). (299.) Fol. 1910. (Purchased.)

Factories. Summary of Returns under S. 130 of Factory and Workshop Act, 1901, of persons employed in 1907 in Non-Textile Factories. (Including statistics of marriage-state of women over 18.) [Cd-5398.] 1910. (*Id.*)

Medicine. Report as to Practice of Medicine and Surgery by unqualified persons in the United Kingdom. [Cd-5422.] 8vo. 1910. (*Id.*)

Pauperism. Comparative Statement of Pauperism and Cost of Relief of Poor in certain years from 1848-1849 to 1909-10. [Cd-5454.] 1910. (*Id.*)

England and Wales—

London County Council—

Curriculum of Training Colleges. Report as to methods for its improvement. 8vo. 1910. (The Council.)

Handbooks containing questions set at certain examinations conducted by the Council during the session 1909-10. With extracts from examiners' reports. [Day and evening classes.] 2 vols., 8vo. 1910. (*Id.*)

(d) Authors, &c.

Alston (*Leonard*). Elements of Indian Taxation. Elements of the Theory of Taxation, with special reference to Indian conditions. ix + 115 pp., sm. 8vo. 1910. (Macmillan and Co.)

Andersson (*Dr. Thor.*)—

Socialsjukförsäkringen och Sveriges Industri. 71 pp., 8vo. Stockholm, 1910. (The Author.)

Sveriges Fiskexport. November, 1910. 5 pp., fol. 1910. (*Id.*)

Atton (*Henry*) and *Holland* (*Henry Hurst*). The King's Customs. Vol. 2. Account of Maritime Revenue, contraband traffic, the introduction of Free Trade, and the abolition of the Navigation and Corn Laws, from 1801 to 1855. With Preface by F. S. Parry, C.B. viii + 506 pp., 8vo. 1910. (Mr. John Murray.)

Barrington (*Amy*) and *Pearson* (*Karl*). Galton Eugenics Laboratory Memoirs. XIV. Preliminary Study of Extreme Alcoholism in Adults. With the assistance of David Heron, D.Sc. 4to. 1910. (The Laboratory.)

Bertillon (*Dr. Jacques*). Des causes de l'abaissement de la natalité en France et des remèdes à y apporter. 55 pp., 8vo. 1910. (The Author.)

Cannon (*Henry W.*). The National Banking System. 23 pp., 4to. 1910. (*Id.*)

Dodd (*Walter Fairleigh*). The Revision and Amendment of State Constitutions. (Johns Hopkins University Studies. New Series. No. 1.) xvii + 350 pp., 8vo. 1910. (The Johns Hopkins Press.)

Eaves (*Lucile*). History of California Labor Legislation, with introductory sketch of the San Francisco Labor Movement. (University of California Publication in Economics. Vol. 2, 1910.) 8vo. 1910. (The University.)

Fishberg (*Maurice*). The Jews: a study of Race and Environment. xix + 578 pp., sm. 8vo. 1910. (The Walter Scott Publishing Co., Ltd.)

Jaechel (*Dr. Reinhold*). Zur Geschichte der Bevölkerung des Kreises Teltow. 8 pp., fol. 1910. (The Author.)

(d) Authors, &c.—*Contd.*

Kapteyn (*J. C.*). Skew Frequency Curves in Biology and Statistics. 15 pp., 8vo. 1903. (The Author.)

Kestner (*Dr. Fritz*)—

Die Ausführungsbestimmungen zu den Reichssteuergesetzen auf Grund der Reichsfinanzreform von 1909. Textausgabe mit alphabetischem Sachregister. 624 pp., 8vo. Leipzig, 1910. (Purchased.)

Reichssteuergesetze nebst Ausführungsbestimmungen auf Grund der Reichsfinanzreform von 1909. Band 1: Reichssteuergesetze. Textausgabe mit Anmerkungen und alphabetischem Sachregister. 539 pp., 8vo. Leipzig, 1909. (*Id.*)

Latham (*Baldwin*). The influence of underground waters on health. 15 pp., 8vo. 1910. (The Author.)

McPherson (*Logan G.*) Transportation in Europe. 285 pp., 8vo. 1910. (Purchased.)

Mahaim (*Ernest*). Enquête sur la situation hygiénique des habitations ouvrières dans la Commune de Herstal. 224 pp., 8vo. 1910. (The Author.)

March (*Lucien*). Essai sur un mode d'exposer les principaux éléments de la théorie statistique. 42 pp., 8vo. Paris, 1911. (*Id.*)

March (*Lucien*). Pour la Race. Infertilité et Puériculture. 32 pp., 8vo. 1910. (*Id.*)

Mayr (*Dr. Georg von*). Statistik und Gesellschaftslehre. Band 3. Sozialstatistik. (Moralstatistik, Bildungsstatistik, Wirtschaftsstatistik, Politische Statistik.) Lieferung 2, pp. 257—450, 8vo. Tübingen, 1910. (*Id.*)

Otto (*Rose*). Über Fabrikarbeit verheirateter Frauen. 299 pp., 8vo. Stuttgart, 1910. (Purchased.)

Pearson (*Karl*) and *Elderton* (*Ethel M.*). Galton Eugenics Laboratory Memoirs. XIII. Second study of the Influence of Parental Alcoholism on the Physique and Ability of the Offspring. Being a reply to certain Medical Critics of the first Memoir and an Examination of the rebutting evidence cited by them. 4to. 1910. (The Laboratory.)

Sandy (*William C.*), M.D. Studies in heredity with examples. 13 pp., 8vo. 1910. (The Author.)

Seyd (*Richard*). Statistics of Failures in the United Kingdom during 1910. 2 pp., fol. 1911. (*Id.*)

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Vol. LXXIV.] [Part III.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

FEBRUARY, 1911.

The ECONOMIC PROGRESS *of* BELGIUM *from* 1880 *to* 1908.[1]

By ARMAND JULIN.

[Read before the Royal Statistical Society, January 17, 1911, the President, the Right Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.]

1. *Object and utility of semiological research.*

THE economic progress of modern nations towards a higher degree of wealth is sometimes slow and sometimes rapid. The movement is irregular, and from time to time it is interrupted by periods of slackness and crisis. It is of great importance to know and to be able to measure these economic depressions as they affect in diverse ways the different classes of society; manufacturers and merchants, capitalists and workpeople, and even Governments suffer in times of crisis. It is of exceptional importance, therefore, for modern society as far as possible to foresee these crises, and to be able to measure their duration and intensity.

On the other hand, to be able to measure with some degree of exactitude the increase in public wealth is one of the prime objects of economic science, and thus some of the controversial questions which agitate economic and political circles may be settled.

The different methods for obtaining these results have been called in statistical science semiotics or semiology, from the Greek word *semeion* (index, symptom). Economic semiology on a statistical basis, as Professor R. Benini calls it, is the method which employs various economic index numbers to measure the fluctuations in the prosperity of a nation.

Neumann-Spallart, in a paper read before the International Statistical Institute in 1887, defined with clearness the range and significance of similar researches when he wrote:—

"One often speaks of the improvement in the general condition "of a nation over a series of years, or, on the contrary, of its decline

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[1] Translated from the French by John A. P. Mackenzie.

" over another period, yet one is unable to demonstrate the reality " or the extent of the change. Speaking of a certain country at " a given period, one may say that it is progressing by leaps and " bounds, that its wealth is increasing, that the public welfare, the " social life and the morality of its inhabitants are advancing. And " of another country or of another period, a general slackening may " be remarked in regard to all the above matters, if not complete " stagnation, or even a reversal of the movement. One speaks of " all these things in a general way as one speaks of climate or of " the weather, without giving precision to an impression which " remains more or less vague. With a view to defining climate or " the weather more exactly, we utilise numerical expressions of " such features as barometric pressure, temperature, atmospheric " humidity, wind pressure, &c. A suitable standard of reference " for each measure has been determined and different averages have " been formed which may be used as exact descriptions of the " weather or the climate.

" If one wishes to judge of the social or economic state of a nation " from the observation of facts, it is equally necessary in the first " instance to ascertain what are the characteristics which can be used " as measures of the features the aggregate of which represents the " economic, social and moral condition of the country in question. " For an inquiry of this nature, it is evident that our choice must " be restricted to those facts which, being in direct relation with " economic and social life, can be accepted as sure symptoms of its " variations. Further, such facts only can be utilised as have been " registered for a series of years in official statistics."[2]

Professor Adolph Wagner traces the same programme of research in his "Principles," Book III, Chapter V, where he says, emphasising thereby the views of Neumann-Spallart:—

" The well-being of a nation, considered in itself and in comparison with that of an earlier period and of other nations, can be " stated by many characteristics which are to be found in the " recorded facts of public life and national economy. These facts " should be observed, collected, checked and systematically elaborated " with this object in view. These results may be obtained from " history, more especially economic history, as well as by systematic " observation, by statistics of the economic and social condition of " the population. Statistics present the facts in question for use in " the descriptive science of politics. This method finally allows of " the drawing of more complete and more precise conclusions.

" In order that the facts in question may be adapted to this

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[2] Neumann-Spallart, "Mesure des variations de l'état économique et social des peuples." *Bull. Inst. Int. de Stat.*, 1887, p. 151.

" purpose, they must fulfil certain conditions. They should be chosen " in such manner, that from them not only such facts as the " national income or the national wealth can be estimated, but also " its distribution, the different kinds of goods, the amounts of " the utilities of which they consist, and especially of the extent " to which the lower classes participate in the consumption of " these goods, and of the manner in which the more wealthy classes " dispose of their incomes and their property."

Such is the general programme of research suggested by the theorists, to which might be added the judicious remarks of Professor R. Benini contained in an article in the *Giornale degli Economisti* for October, 1909, which I regret that I cannot quote here without exceeding the limits to which these introductory remarks should extend.

Practical researches into this delicate question are somewhat rare. I can but mention those of Neumann-Spallart, cited above, those of de Foville which appeared in the *Journal de la Société de Statistique de Paris*, and those which Benini published in 1892 on the semiology of Italy in the *Giornale degli Economisti*.

To these studies I have endeavoured to make a further contribution dealing with Belgium and covering the period of twenty-nine years from 1880 to 1908 inclusive, and I venture to hope that I have not in this undertaken too ambitious a task.

Belgium has not as yet been the object of any comprehensive study of this nature. The economic development of this country, nevertheless, especially during the last fifteen years, has been considerable. Frequent allusions to its progress have been made in many official speeches, some of them by persons in high office. Numerous writings have been produced with the object of drawing attention to certain prominent phases of this prosperity, such as the movements in international exchange, the increase in the numbers of workmen employed, and deposits in the savings banks. But no attempt has been made to study the question as a whole, no method has been proposed for measuring this prosperity. The present paper is an endeavour to fill the blank, imperfectly, I fear, but in the hope that the work will be of interest if only because of the length of the period treated and the number and variety of the indices employed.

2. *Simple and aggregate index numbers.*

May we ever hope to find an index of such a nature that from its variations for good or for evil, progressive or regressive, we can infer analogous modifications, qualitative and quantitative, in the social body considered as a whole—the index chosen, after the manner of a barometer, showing an upward tendency in times of prosperity and a downward tendency in times of crisis?

Certain authors have thought themselves justified in drawing precise conclusions from a single index. In the front rank of these may be mentioned Dr. Juglar, whose book on crises has become a classic and whose theories have been taken up and developed by numerous authors.

Cauwès in his "Traité d'Economie Politique" summarises so well Dr. Juglar's theory that I cannot do better than reproduce here his analysis of it:—

"M. Juglar started on the principle that industrial crises have "an immediate counter effect on the money market. During the "upward period of credit there occurs at the same time a rise in "prices and in the rate of interest; and on the other hand a "diminution of bank reserves and a rise in the rate of discount. "The premonitory signs of a crisis are, as a result of excessive "importations, a rapid diminution in metallic reserves. When "the crisis becomes acute the discounts of the bank are extended, "deposits are withdrawn and what remains of the reserve is "protected by an exorbitant rate of discount, which may be as "high as ten per cent. This is the principal means of preventing "crises, but its operation is not always successful. Failures increase; "it is a time of bankruptcy. After this acute period metallic "reserves and deposits increase, the rate of interest becomes weaker, "the discounts of the bank are reduced, and at the same time "the issue of bank notes is reduced. So long as the period of "stagnation which follows the liquidation lasts, foreign trade, "especially on its import side, is restricted so far as circum-"stances permit."

Such is the theory of Juglar, briefly summarised, according to which the study of the discounts and of the metallic reserves [of the bank] should furnish the general economic index which is required.

Another example of a simple index is that furnished by the fluctuations in the number of marriages. Dr. Farr considered that the statistics as to number of marriages were a true barometer of public prosperity. The existence of peace or war, the high or low level of the cost of living, the demand for labour and the development of industry were so many circumstances which influenced the coefficient of nuptiality.[3] The conclusions of the English demographer are, on the whole, still true to-day.

Finally, the changes in the value of foreign trade have also been used as a measure of advance or decline in the prosperity of nations. Mr. Stephen Bourne in particular constructed index numbers in

[3] W. Farr, *Vital Statistics,* Memorial Volume. London, 1885. P. 69.

which the value of the products imported from the colonies and from abroad, the re-exports of these same products, and the exports of British products during the years 1878 to 1888 were considered, the year 1883 having been taken as the basis of comparison.[4] The first President of the International Statistical Institute, Sir Rawson W. Rawson, also proposed an original and rapid method of measuring the fluctuations in the purchasing power of the monetary standard.[5] I will not go further into the details of these methods which are well-known, especially in England.

Professor Pantaleoni has discussed in detail the value of the simple index considered as a measure of the economic and social progress of a nation.[6] He has shown how the conclusions that may be drawn from such an index may be insufficient and even misleading. It is clear that the progress of a nation depends upon a number of factors and that consequently it cannot be measured in a single direction. I have adopted the views of Pantaleoni and have applied the system of the aggregate index number (*indice totalisateur*), in which a large number of statistical results are considered and combined into one final numerical expression, of which the variations constitute the degrees of the index numbers to be constructed.

3. *Construction of the aggregate index number.*

A given situation is described more or less correctly according as the characteristics which are specified are numerous and well chosen. This simple statement applies to all phenomena, but more especially to economic and social phenomena, the complexity of which is well known, and which, to be examined with fruitful results, should be looked at from a number of different points of view. This is the first reason why the data from which the aggregate index number is constructed should be as numerous as possible.

The second reason is equally essential, namely—the more numerous the different quantities the less important will be the final error which may result from the inadequacy of any of the returns. The final index is obtained by the method which gives the simple arithmetic meån. Consequently, if one of the terms is somewhat inexact, the importance of the error is one-twentieth should twenty simple index numbers be combined in the aggregate, whereas it would be but one-fortieth should the simple index numbers amount to forty.

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[4] *Report of British Association*, p. 696. London, 1890. See also the Paper by S. Bourne in the *Journal of the Royal Statistical Society* for 1889, p. 399.

[5] See *Report of British Association*, 1890, p. 133, containing Professor Edgeworth's report, which gives a remarkable analysis of these different methods.

[6] Pantaleoni, "Osservazioni sulla semiologia economica." (*Scritti varii di Economia.*)

But theoretical exigencies are strictly limited by practical possibilities. In hardly any country will the official statistics give to the observer material as full and accurate as he requires. The information given is deplorably incomplete, and changes in the method of compilation render comparisons impossible. Inspection of statistical returns of any nature for a series of years will usually disclose discrepancies which detract from the value of the information given. All who have studied the practical application of the semiological method are agreed that the success of their labours is dependant on an improvement in official statistics in regard to exactitude and scientific treatment and an extension of the field which they cover.

Belgium cannot, any more than other countries, boast of having her statistical material sufficiently complete and well arranged. Her industrial statistics are very incomplete, and those relating to production have as yet only been sketched out. Essential portions of the financial statistics are based on a legislative system quite out of date and in flagrant contradiction to the actual economic facts. As regards the monetary circulation, the data available are such that the statistician is obliged to abandon a source of information which might, in other circumstances, be highly instructive. It should be added that the decentralisation that exists among the different Government departments, as regards their respective statistical publications, further adds to the insecurity of the available data and to the difficulty of grouping them in one homogeneous whole.

These difficulties should not, however, deter one from attempting to utilise the material such as it is. But it will be seen that great prudence and care are required in doing so.

The aggregate index number which I have calculated is based on 43 special index numbers distributed in the four following groups:—

I. *Demographic and moral* (9 index numbers).—Legitimate births, illegitimate births, deaths, suicides, marriages, recognition of natural children by marriage, number of convictions for crimes, number of convictions for minor offences under the penal code, number of lunatics.

II. *Industrial production* (7 index numbers).—Quantity of coal extracted, value of the produce of quarries, value of iron produced, of steel, of zinc, lead and silver, number of steam engines, horse-power of steam engines used in industries.

III. *Exchange* (15 index numbers).—Value of imports (special trade), value of exports (special trade), net tonnage of vessels entered, ton-mileage of goods transported by navigable waterways (coal and coke only), railways (number of travellers), railways (quantities of goods), railways (aggregate receipts), postal circulation (total revenue), number of telegrams (in connection with the Stock Exchange and commerce), amount of bills discounted at the National Bank, amount of bills collected by the post office, receipts from fees collected on postal money orders, average rate of discount, bankruptcies, index numbers of agricultural products.

IV. *Consumption and revenue* (12 index numbers).—Consumption of beer, wines imported for home consumption, consumption of tobacco, average wages of miners, pawnbroking institutions, legacy duties and succession duties, taxes on joint stock companies, other commercial taxes (*patentes*), cadastral value of house property, amount of deposits of less than 3,000 francs in the savings banks, number of individual depositors in savings banks, average price of the Belgian 3 per cents.

These index numbers represent about all that can be utilised in this form of research if it is to extend over a period of years of sufficient length. Certain omissions from these lists may cause surprise. I will, therefore, briefly state in the case of some of the more important ones the reason for their omission :—

Divorces.—The number of divorces was not included among the moral index numbers, partly because their signification is at bottom indefinite, and also because there were special difficulties in their statistical treatment.

Production of glass.—The figures of the production of glass are not complete for the period with which I deal. A distinguished engineer, M. Cuttier, has with much labour succeeded in completing these statistics, and has kindly offered me the use of them. Unfortunately this industry has been much disturbed by labour disputes, and at the same time the conditions of sale have been influenced by combinations among producers. I did not think, therefore, these figures fulfilled the requisite conditions for use in the aggregate index number.

Ton-mileage on waterways is given only for coal and coke. It is only since 1888 that the navigation by sea-going vessels has been completely separated in the official returns from that of vessels intended for inland waterways only. Coal and coke are the only two items that escape this cause of error, the quantities imported by sea, especially from 1880 to 1888, having been insignificant.

Consumption of sugar has been excluded, owing to important changes in fiscal legislation. The reduced price which has been the result has led to an increase in its consumption, though this, in the circumstances, cannot be taken as an indication of increased well-being.

The same may also almost be said of *coffee*. Moreover, since the recent abolition of the duties on green coffees, large quantities have been declared for home consumption, instead of as re-exported.

The significance of *emigration* as an index of the depressed situation of a country is contested.[7] Besides, as regards Belgium, it must be borne in mind that there are emigration offices organised by foreign governments, but their operations have been intermittent.

I have been unable to take into account the fluctuations of the reserve of the National Bank owing to the special conditions affecting the Belgian money market.

Finally, a number of index numbers have not been utilised either because they have not been recorded for a sufficient period (such as strikes) or because changes in legislation have modified the significance which their variations might offer.

4. *Positive or negative significance of index numbers.*

Between the 43 index numbers mentioned there are essential differences. In some cases all increases may be taken as favourable; in others an increase is an unfavourable symptom. It follows, therefore, that the mechanism of statistical treatment cannot be the same for all. The aggregate index number is an application of the method of index numbers in which the figures of a certain year considered as a base are taken as unity and all the other figures are compared with this standard. In the case of index numbers of prices, the indices expressed as percentages are added together into one total. But we cannot add together negative and positive quantities, and this is what would be the effect were we to add together all the various increases of the phenomena under review expressing them as percentages in excess of the standard. It is therefore necessary to adjust the unfavourable index numbers expressed as percentages, decreasing them by as many degrees as they show above 100, or increasing them by as many degrees as they show below 100.

The following example is taken from my tables and is worked on the same base as the analogous figures given by Benini. The comparison may be of interest:—[8]

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[7] See the discussion at the International Statistical Institute after Neumann-Spallart's communication.

[8] See Benini's article in the *Giornale degli Economisti* for February, 1892.

	1881.	1882.	1883.	1884.	1885.
Marriages—					
Calculated figures	207	203	204	*198*	199
Percentage variations	104·5	102·5	103	*100*	100·5
Bankruptcies—					
Calculated figures	111·2	112 8	128·6	*133·3*	120·4
Percentage variations (*a*)	83·4	86·4	96·5	*100*	91·3
Percentage variations (*b*)	116·6	113·6	103·5		108·7

	1886.	1887.	1888.	1889.	1890.
Marriages—					
Calculated figures	196	208	206	210	215
Percentage variations	99	105	104	106·1	108 5
Bankruptcies—					
Calculated figures	127·8	129·1	136·1	128·9	121·2
Percentage variations (*a*)	95·8	96·8	102·1	96·7	90·9
Percentage variations (*b*)	104·2	103·2	97·9	103·3	109·1

(*a*) As first calculated. (*b*) As adjusted.

The figures (percentages) intended for use as our "index numbers" increase in the proportion of the calculated absolute numbers, when these have a favourable significance. They increase or decrease in inverse ratio when the phenomena show an unfavourable significance in order that they may figure in the final result of the aggregate index number.

In the list of index numbers which serve as a base of my calculations, the following are considered as pathological and subject to adjustment:—

Illegitimate births, deaths, suicides, convictions for crimes, convictions for minor offences under the Penal Code, lunatics, bankruptcies, pawnbroking institutions, or 8 pathological index numbers, as against 35 eulogic or physicological ones.

The calculation of the percentages is made from the figures compared, and then as regards the pathological index numbers, the results are adjusted.

A drawback to this method shows itself when the progression of the pathological index is infinite, because in this case the values expressed in percentages become negative. Professor Aug. Bosco has called attention to certain means of eliminating this trouble, but I have not had occasion to use them. It is only in the case of divorces that the difficulty in question would arise.

5. *Weighted index numbers and proportionalised index numbers.*

It has been remarked with reason that as regards the method of index numbers applied to prices, the simple arithmetic mean is somewhat unsatisfactory. Variations of equal amplitude may frequently present for the mass of the nation a very different importance according as the consumption of a certain article is great or small. The well-known writings of Sir R. H. Inglis Palgrave have solved this question as regards prices, but the solution has yet to be found as regards the subject now under discussion. It is clear that all the tendencies, favourable or unfavourable, expressed by the collected figures, cannot be considered as having equal values from the point of view of the well-being of the mass of the people. The marriage rate, when it is rising, is a favourable index of an importance very different, for example, from the increase in the consumption of imported wines. In the same manner, among the pathological indices, some fear a far graver significance of evil than others. No method of dealing with this defect has been suggested, beyond that of increasing as much as possible the index numbers and exercising great care in their selection. I do not think it possible to find one common term to which all the index numbers can be reduced. The employment of the method of weighting suggests a standard measure for comparison of the relative weights, but there exists no common measure among the phenomena, entirely different in nature and importance as they are, which are taken into consideration in the aggregate index number.

In this respect, the only system—rudimentary, it is true—which can be employed, consists in the use of more or less numerous indices of a like order: moral, industrial, agricultural, commercial, &c.

Thus in my system of indices, the demographic indices, six in number, represent with regard to the total a value of $\frac{6}{43}$, the indices relative to industrial production $\frac{7}{43}$, those dealing with foreign trade $\frac{3}{43}$, &c., but even if one wishes to maintain a certain equilibrium among the indices of different nature, it is not possible to fix a measure which shall be exact and unchangeable.

It is otherwise as regards the relations to be established between the indices and certain general phenomena on which they are dependant and which, in a sense, determine them.

One can easily understand that the importance of certain facts can only be measured by taking into account the extension taken by certain others. There were in Belgium in 1884, 121,070 deaths, and in 1891 128,786: can it be said that the mortality has increased? The answer is only possible on the condition that the relation be calculated of the number of deaths to the number of inhabitants.

The calculation gives 100 for both the years 1891 and 1881. The number of deaths has therefore increased, but the rate of mortality has remained stationary. I must ask you to forgive me for recalling these elementary facts, but they lead us gradually to others of greater complexity. The regularity of certain progressions or regressions, especially in demography, is well known. This regularity is not observed elsewhere, however, especially in the spheres of free economic activity. Under the influence of crisis or of prosperous times, we see the production of certain goods attain enormous dimensions, or suddenly their output is greatly restricted. If these violent fluctuations were reflected directly in proportional values in regard to a base to be fixed, they would affect in too violent a manner the aggregate index number, giving it an irregular appearance not corresponding with the true state of affairs. The relations established with other phenomena reduce this hyperexcitation, and this is one and not the least of the special advantages of this technical operation. The value of the production of coal, for example, was in 1884, 18,051,499 frs., and it rose in 1908 to 24,206,953 frs., or an increase in the proportion of 100 to 134, whereas taken in relation to the population, the proportion of increase is only that of 100 to 105.

The phenomenon with which in general the index in question may be brought into relation may be easily seen. Population is the factor which conditions and determines many others, or which is the principal element in their development, either taking the population as a whole, or only certain of its classes.

There are, however, other elements which must be considered. In the system of index numbers which I have prepared the population has sometimes been considered as a whole, but occasionally only certain portions of it have been considered, and sometimes the point of comparison has been sought in another direction.

By population I mean the number of persons inscribed on the registers of population, and at each decennial enumeration the figures recorded by the census.

The following index numbers have been constructed on the basis of their relation to the entire population:—

Deaths, suicides, convictions for crimes and convictions for minor offences under the Penal Code, number of lunatics, production of coal mines, value of the production of quarries, of iron (both manufactured and pig), of steel, of silver, lead and zinc, the number and power of prime movers, imports and exports (special trade), postal circulation, number of telegrams in connection with Stock Exchange transactions and industrial affairs, amount of bills discounted at the National Bank, amount of bills collected by the Post Office, fees collected on money and postal orders, amount of the taxes charged on joint stock companies, other business taxes, consumption of beer, wine and tobacco, cadastral value of house property, deposits in savings banks, number of individual accounts in the savings banks—in all 27 index numbers.

The 16 remaining index numbers are either calculated on other bases, or the absolute figures have been simply transformed into proportional numbers. Among the latter are the following:—

Average price of Belgian 3 per cents., average wage of miners, index numbers of agricultural products, average rate of discount, net tonnage of shipping (entrances), or five in all, for which I was unable to find any different phenomena with which they might be brought into relation, or for which the material that might have served for comparison was lacking.

The 11 other index numbers have been calculated on different bases:—

A. Index numbers calculated on certain groups of the population. The index numbers which come under this head are those dealing with legitimate births and marriages. In these cases the numbers of the population who had attained the legal age requisite for marriage (18 years for men and 15 years for women, *Code Civil* 144) have been taken. The numbers in question had to be estimated, in view of their absence from the yearly returns.

B. Index numbers calculated in relation to certain demographic phenomena. The index numbers coming under this head are the illegitimate births, for which the ratio to legitimate births has been taken. The recognition of natural children by subsequent marriage has been compared with the number of illegitimate births. Succession duties collected each year have been compared with the number of deaths in the preceding year.

C. Index numbers calculated in relation to the development of the means of transport. The number of passengers, the number of tons of merchandize, and the receipts of the railways, have been expressed in relation to the length of railways open for traffic each year. The quantities of goods transported by water have been calculated in relation to the length of navigable waterways open to traffic.

D. Index numbers calculated in relation to other index numbers. For the produce of sales of objects pledged in pawnbroking institutions, the index number has been obtained by comparing this sum with the amount of the pledges of the preceding year. As regards the bankruptcies it would have been desirable to compare their number with that of the persons paying the business tax. As the latter figures are not available, the number of bankruptcies has been compared with total proceeds of the tax for the corresponding year, the taxes levied on joint stock companies being excluded.

6. *Brief examination of the statistical material used.*

A complete study of the statistical material, of its defects, and of the sources of error found therein, would be as extensive as the whole of the present paper. I will confine myself therefore to a brief statement to enable the reader to form an idea of the degree of exactitude that may be assigned to the data utilized. To be methodical, I keep to the same order as before in the enumeration of the different index numbers, with any remarks thereon, omitting those which do not require any special comment.

Legitimate and illegitimate births.—The statistics of births are among the most trustworthy data that can be used. The registration of births, &c., is regulated by the civil code (Code Napoleon). Only living births have been taken into account. Still-births and infants living only one, two or three days, are excluded from the statistics. No changes in the regulations concerning registrations of births have taken place during the period under review.

Deaths and suicides.—The statistics of deaths are furnished from the Registration Returns in accordance with articles 77 to 87 of the civil code, and the numbers thus obtained afford the maximum of reliability. This cannot be said of the *suicides*, which are a subdivision of the first statistics. The municipal authorities are charged with the collection of the returns of suicide, based on the declarations required to be made by the Registration Medical Officers, but the families may be able to suppress the truth as regards the circumstances of the death and, besides, there is no official definition of suicide, with the result that owing to want of knowledge medical practitioners may hesitate to notify a death as such, as, for example, in the case of suicide by a lunatic. These causes of error, as well as others, leave room for doubt as to the accuracy of these numbers; but it should be added that the causes have not varied during the period under notice.

Marriages.—The numerous formalities preceding a marriage, its publicity, the ceremony and its form of celebration, are guarantees as to the number of marriages contracted. Perhaps to be exact the coefficient of marriage should be calculated on the population of marriageable age, but this coefficient can only be calculated with certainty at census periods. It is usual, therefore, to calculate the coefficient of marriage by bringing the number of marriages into comparison with the total population. This coefficient measures the general tendency towards marriage, which is the object sought after in a study whose purpose it is to find out in what way and to what extent economic and social conditions can influence the marriage rate. This coefficient is wanting in precision, because it brings into the calculation the large portion of the population who are incapable of contracting a legal marriage. If this fraction varies in different countries or has a relative importance which is variable from one time to another, the coefficient of nuptiality will equally vary. It is for the purpose of eliminating these influences that I have made the calculations on the basis of the number of couples existing among the population of marriageable age. (That is, excluding males under 18 and females under 15 years of age.)

Convictions.—Convictions by the Assize Courts, or for crimes by the Correctional Courts, as well as convictions for offences under the Penal Code, are known numerically with precision. It happens, however, that certain offences regarded by the law as crimes, which, as such, should be tried by the Assize Courts, are *correctionalisées*, that is, sent back, owing to certain circumstances, to the Correctional Court. Jurisprudence and the tendencies of the Courts being at variance in this respect, a diminution in the number of convictions before the Assize Courts cannot be taken as showing a diminution in crime. It is necessary to add the convictions before the Correctional Courts. On the other hand, offences dealt with by the Correctional Courts have become more numerous, owing to new laws coming into force. If one wishes to obtain a homogeneous series of figures, it is necessary to consider only offences coming from a unique source, such as offences within the cognizance of the Penal Code.

The Belgian Judicial Statistics are in some respects incomplete, but the Chief of the Office of Judicial Statistics in Belgium has kindly helped me to fill the blanks, and I take this opportunity of thanking him for his assistance.

Statistics of production do not exist in Belgium. We have to fall back, therefore, on such special returns as are published by certain departments, such as the Administration of Mines or of the Excise. The Excise statistics deal with the production of beer, vinegar and brandy, sugars and glucose, native tobaccos, and margarine. Several of these commodities being included, from the point of view of consumption, in other portions of the index numbers, we have not considered them in relation to production, since the latter point of view is intimately related to the former.

The mining engineers investigate regularly the establishments subject to their inspection, that is, mines, quarries and iron and steel works administered under the law of 1810. The returns as to the production of coal mines (quantities and values) bear a character of relative exactitude, because they were to establish the amount of a special tax, the *redevance des mines* (quit-rent) which takes the place of the business tax (*patente*). The returns are checked with care and are taken from the books of the coal mining companies. The figures as regards quarries are not so trustworthy because in certain cases the information is obtained by the municipal authorities and is beyond the check of the mining engineer. The important quarries, however, furnish correct returns. In the metal mines and open workings, iron and steel works, the statistics are collected by the mining engineers, but the figures are not as accurate as those for the coal mines. They are of considerable statistical value, however, if taken as a whole.

The statistics of the production of lead, as published by the Administration of Mines, have undergone certain corrections for the years 1901 to 1903 and 1906 to 1908. In the figures for these years lead brought from abroad for the extraction of the silver therein were included. These figures have, however, been amended, so as to restore the regularity of the series of figures.

The number and horse-power of steam engines in use in the kingdom are compiled by the mining engineers, and by the engineers of the Department of Roads and Bridges, in the provinces which do not come within the administrative area of the officers of mines. These statistics are published each year by the Administration of Mines. From the nature of the supervision exercised by these officials, it may be taken that the results of their investigations are trustworthy.

The geographical position of Belgium between great industrial nations has contributed to give great activity to its commercial relations, and for this reason the third portion of our index numbers is of special interest. Among the phenomena noticed, the *export trade* (special trade) is one of the most significant of the state of economic prosperity, especially when it is—as in this case—combined with others. The special commission appointed in France to study economic crises found that it was better to consider special trade as a whole rather than its divisions, and this is the method I have followed. The relation to population is the only workable one, according to the same commission, though it is inadequate. In Belgium, the value of the foreign trade is based on the declaration of the importers and exporters of goods subject to *ad valorem* import duties, and according to the official values for each year prepared by the Special Commission as regards the other products exchanged. The absolute figures given in my table differ from the official figures because I have omitted gold and silver bullion and specie, which are included in the official returns from 1905. Uncut diamonds which have been included in the official statistics since 1898, and indigo which has only been included in the exports since 1904, have also been excluded from my figures. The exclusion of these elements gives to the series of numbers a more homogeneous character. The measurement of the tonnage of sea-going vessels is carried out in accordance with the law of January 20, 1883. Since January 1, 1884, the measurement has been based on the Moorsom method. I have therefore omitted the years 1880-83 to keep the numbers uniform and comparable.

The statistics of inland transport on the navigable waterways, which are drawn up in groups of products, would be very interesting to consult, but unfortunately only the figures for coal and coke can be used, they being the only ones whose home origin is not in dispute. Moreover, it is only since 1884 that sea-going vessels were excluded in these returns. This confusion prevents all comparison between the first and second parts of this series. The statistics taken from the returns of the Ministry of Railways, posts and telegraphs, include the number of travellers, the tonnage of the goods transported, the amount of receipts, the fees collected by the head of the postal circulation, the number of telegrams dealing with stock exchange and commercial affairs, the amount of bills collected by the post office, and also of the fees on money and postal orders. The returns relative to railways are compared with their length of lines in operation; the other statistics are compared with the population.

Although these index numbers are used in all semiological studies and although their value as a whole cannot be contested, nor the accuracy of some of them,[9] it is nevertheless true that they furnish an interpretation of economic conditions which is generally optimistic. For example, the number of passengers carried on the railways has increased from year to year, even during years of depression, the only effect of the latter being to reduce the rate of progress and keep it within more restricted limits. To avoid the want of homogeneity resulting from the purchase by the State of certain lines in 1895, I have combined the figures relating to State and private railways. This precaution has not, however, been sufficient to eliminate secondary causes of error, resulting from discrepancies between the methods of calculation in use by the State railways and those privately owned. It can be easily understood that the numbers travelling on the railways should have increased independently of economic conditions. The growing facilities for travel, the increase in the number of trains and of stations, the issue of season tickets for short periods at reduced prices, changes in habit, and special circumstances, such as industrial exhibitions, holidays, public rejoicings help to explain this increase, though we are unable to establish a well determined link between this fact and general economic conditions. No doubt there is a certain falling off in the traffic in proximity to years of depression, but in a general way the index number maintains its optimistic nature. It shows, however, a modification in social conditions, which is far from being without importance and cannot therefore be overlooked, though precautions as to its interpretation must be borne in mind. A similar reserve must be observed in regard to the taxes collected by the postal authorities, of which the increase is due to the spread of education and of social relations—an interesting phenomenon from the general point of view, although of little economic significance. Finally, the increase in the commercial bills collected by the post office, as well as the amount of fees on money and postal orders may be attributed to a greater utilisation by the public of a convenience placed at their disposal, though we cannot conclude therefrom that there has been an increase in the total transactions of this nature in the country. On the other hand, the quantity of goods carried on the railways, and the number of commercial telegrams sent and received in the interior of the country correspond directly with general economic conditions.

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[9] Several of the returns are compiled from the accounts of public departments and, as such, they are subject to rigorous supervision. All those returns, which are a basis for taxation, may be taken as possessing a greater degree of accuracy than those resulting from an enumeration of units.

Juglar, a summary of whose views by Cawès I gave earlier in this paper, attaches much value to the index numbers relating to the condition of banks.

" When the crisis becomes acute the discounts of the banks are " extended, deposits are withdrawn, and what remains of the reserve " is protected by an exorbitant rate [of discount] which may rise to " 10 per cent. This is the great preventative of crisis, but it is not " always successful in preventing them." The bills discounted by the National Bank of Belgium are, therefore, an important index, the more so because the amount of these bills represents, according to authorities like Professor Hector Denis, 80 per cent. of the total discounts. The rate of discount is in direct relation to the state of the crisis or of prosperity. It is not, therefore, necessary for us to justify its use. Whatever may be the theoretical importance of observing the metallic reserve of the National Bank and of the study of the notes in circulation, I have been unable to utilise it. The metallic reserve of the National Bank is manifestly short by 50,000,000 francs of what it should be, if it is admitted that the notes in circulation should be covered to the extent of one-third by the reserve. There is an excess of notes in circulation especially of the denominations of 50 and 20 francs: the increase in the circulation has been made to the detriment of effective metallic cover.[10] Further, the reserve is menaced by the systematic drain which speculators have been able to organise, owing to the unfavourable rate of exchange on Paris.[11] Under these conditions, it is not possible to say that the situation of the Bank's reserve is normal, or that its variations can be of service as regards economic conditions.

Index numbers of prices, which are of much value for the study of variations in economic conditions, do not exist in Belgium, at least not under conditions which allow of their being of real value. Professor Hector Denis, in his work on "Depression des Prix," has endeavoured to calculate certain index numbers of prices in Belgium, and has continued the work elsewhere. Unfortunately the prices used by M. Denis are those used for fixing the customs values, and I find that the averages adopted by the Commission for the official values correspond but remotely with the real fluctuations in prices. The index numbers calculated by M. Denis are notably lower than those calculated in England, and for this reason I have thought it best not to use them. I have calculated the *prices of the principal agricultural products* according to the official prices of the sales at the principal markets. This, however, is no more than an expedient, since the prices of goods in this aggregate would have quite another significance.

The statistics of consumption and revenue, and of production, are among the most incomplete in Belgium. The enumeration of the documents desired would be longer than that of the information we possess. A few of the goods of popular consumption are known with accuracy, since they are under fiscal supervision. Such, for example, are the consumption of beer, wines and tobacco. As two at least of these articles are not necessaries of life, their consumption may be regarded as directly influenced by economic conditions. If we observe the third, it is seen that its consumption, though always remaining at a high level, increases in prosperous years and drops during years of depression. The certainty that the duties are rigorously collected and that their amounts are exactly registered in the fiscal returns is a guarantee of the reliability of the returns.

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[10] See M. G. de Laverleye's note in the *Moniteur des intérêts matériels,* April, 1910. Brussels.

[11] M. Ansiaux, "Les problèmes de la circulation monétaire en Belgique." *Revue économique internationale,* 1907. Brussels.

We would possess an excellent index if we had the statistics of the *wages* that were paid to a large number of workmen, year by year, at least for the principal industries. Unfortunately the reality falls short of this ideal. We certainly possess in Belgium a number of data—scientifically established—as regards wages, and in the first rank should be mentioned those brought together at the General Census of Industries and Trades in 1896 and in subsequent enquiries by the Belgian Labour Department. But there is absolutely no continuity in these enquiries. Of all the material brought together dealing with wages the only permanent returns are the statistics of wages of miners collected by the mining engineers. The basis of these returns are the pay-sheets of the different coal mines, and they may be taken as correct. I cannot say as much of the *average wage* of the miner, but we have not to examine this question here, as the only point that concerns us is the fluctuations of the wages, not their actual amount. The statistics issued by the Administration of Mines as to wages paid to the workers in iron and steel works are much less trustworthy, and I have not utilised them.

An increase in the pledges at pawnbroking institutions is generally taken as an unfavourable sign. This point is worth studying in more detail. The pawning of objects of furniture has but a feeble signification if they are redeemed within the legal time limit. On the contrary, if the time limit is allowed to lapse and the objects are left to be sold, we may conclude with more certainty as to an unfavourable situation. In this case it is desirable to compare the amount of the sales of the unredeemed objects with the amount advanced on pledges in the preceding year. This is what I have done with this index number, though it must be remembered that even then the figure is somewhat uncertain, owing to several circumstances.

The sums received by the State from the legacy and succession duties, the business taxes, and the amount of the cadastral value of house property are, I think, the only financial statistics which can be utilised as regards the condition of Belgium. It seems little compared with the numerous index numbers which might be furnished by the financial statistics, but these are, in Belgium, more administrative than economic. Again, in using these figures it is desirable to define their limit. The legacy duties are those received on movable property (*valeurs mobilières*) declared at the time of succession. The succession duties are collected on real estate.

Owing to lack of control, the legacy duties are far from giving an exact idea of the movable wealth of the country. The succession duties give a more trustworthy estimate. In my calculations, the total of the two duties have been compared with the number of deaths in the preceding year. The land tax is assessed on the net income of land and buildings. The net taxable income from landed property was fixed in 1860, based on the average of the leases and sales executed from 1849 to 1868. The net taxable income from land apart from buildings being fixed, it cannot be taken as symptomatic of the economic situation of the country. As regards house property, the conditions are the same, but actually the amount of the duties increase in proportion to new buildings, re-constructions, extensions, &c. We can therefore utilise the figures of the cadastral value of built property as an index of the development of that property, but nothing can be found therein as regards the increase in the sale of land.

The business tax is charged on all regularly engaged in commerce, the professions, industry, trade or retail dealing, with certain exceptions fixed by law. This tax is based on the proportionate amount of the industrial and commercial profits, estimated according to the relative importance and the greater or lesser remunerativeness of the occupation or business of each taxpayer. It is in these terms that an official publication[12] describes the business tax. In reality, however, the tax is imposed whether the taxpayer has made any profits or not; further, in practice the assessment of this tax is arbitrary and illogical, as it is based on tables drawn up in 1819.[13] It is necessary, therefore, to consider the amount of the business tax not as measuring in an exact manner the absolute development of the wealth of Belgium, but to take it solely as an index of that progress in a relative sense. I should add that this tax is collected on a different basis from joint stock companies and from individuals—a consideration which has induced me to present separately the returns relating to its receipts.[14]

The statistics of *savings banks* have often been suggested as a source of information for the kind of research upon which I am now engaged. In Belgium this research is somewhat facilitated by the fact that the General Savings Banks and Pension Fund are under the guarantee of the State, thus centralising an important fraction of popular savings. A portion, however, of these savings is contained in private savings banks and in numerous thrift societies established among the lower middle classes and workmen. No statistics exist in regard to these institutions, so that we must confine ourselves to the figures of the General Savings Bank and Pension Fund. In accepting these figures, a double discrimination must be used. In the first place, one must eliminate the amount of deposits made by public departments; secondly, it is necessary to take note only of deposits below a certain sum, say less than 3,000 francs, so that the index number may apply to the greater portion of the nation. Reductions in the rate of interest in 1894 and in 1902 have affected the regularity of the curve; and in order to eliminate this disturbing influence, I have subtracted from my calculations these two years and the two years which immediately follow them. The number of depositors is by itself an index which I have thought it well to utilise, together with the increase in deposits.

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[12] *Exposé de la situation du Royaume de* 1876 *à* 1900.

[13] J. Ingenbleek. *Impôts directs et indirects sur le revenu.* Bruxelles, 1908.

[14] I am indebted for these unpublished figures to the kindness of M. Renauld, Inspector-General, and I take this opportunity of expressing my thanks to him.

Finally, I have taken as a last index the *average price of the Belgian 3 per cent. Rentes.*

7. *General results.*

In working in accordance with the methods described, we arrive at the results given below. The bases of these calculations are shown in the two tables annexed to this Paper. In Table I the numbers are absolute, and in Table II they are proportional. All proportional numbers have been worked to two places of decimals, and have then been made into round numbers. The greater part of the necessary calculations have been made by M. J. Bribosia, Doctor of Laws and Licentiate in commercial and consular science, and I am most grateful to him for his patient and devoted collaboration.

Table A gives for each group and for each year the figures resulting from the addition of the percentages :—

TABLE A.

Years.	Total by groups.				Grand total.
	I.	II.	III.	IV.	
1880	831·2	—	1478·7	1012·4	3420·2 *
'81	945·9	715·3	1379·1	1071·6	4111·9 †
'82	906·2	770·9	1484·8	1144·5	4306·4 ‡
'83	905·2	754·3	1514·6	1126·9	4301·0 ‡
'84	*900·0*	*700·0*	*1500·0*	*1200·0*	*4300·0*
'85	890·3	651·8	1490·3	1178·9	4211·33
'86	866·0	646·0	1500·7	1095·4	4108·12 ‡
'87	857·7	701·2	1558·0	1098·6	4215·5 ‡
'88	863·8	736·3	1590·5	1117·5	4308·1 ‡
'89	856·5	806·5	1653·1	1143·4	4459·5 ‡
1890	853·7	874·3	1736·9	1546·5	5011·4
'91	844·2	840·9	1804·0	1584·8	5073·9
'92	801·5	818·7	1774·7	1616·5	5011·4
'93	812·8	802·2	1786·8	1651·7	5053·5
'94	827·7	840·4	1825·0	1669·1	5162·2
'95	868·3	854·4	1869·4	1727·5	5319·6
'96	873·4	993·7	1892·3	1868·8	5628·2
'97	888·6	1053·3	1987·1	1944·3	5873·3
'98	918·6	1140·9	1970·5	2185·0	6215·0 ‡
'99	917·4	1302·6	2155·9	2195·2	6571·1
1900	909·5	1349·5	2233·3	2364·9	6857·2
'01	917·5	1138·7	2265·0	2415·8	6737·0
'02	895·7	1257·0	2341·7	2291·2	6785·6
'03	907·0	1384·5	2428·5	2408·6	7128·7
'04	929·9	1477·6	2486·1	2483·8	7377·4
'05	922·0	1544·5	2626·5	2615·1	7708·1
'06	923·0	1727·3	2747·8	2760·1	8158·2
'07	935·4	1810·5	2810·6	2844·9	8401·4
'08	912·4	1544·3	2541·6	2685·4	7683·7 †

* Divisor 35. † Divisor 41. ‡ Divisor 42.

Table B gives the index numbers of each of the four groups under review, as well as the general index numbers. The figures are worked to two places of decimals.

TABLE B.

Years.	Index by groups.				General index numbers.
	I.	II.	III.	IV.	
1880	103·90	—	98·58	92·04	97·72
'81 ...	105·10	102·18	98·50	97·42	100·29
'82 ...	100·69	110·13	98·99	104·05	102·53
'83	100·58	107·76	100·98	102·45	102·40
'84	*100·00*	*100·00*	*100·00*	*100·00*	*100·00*
'85 ...	98·93	93·11	99·35	98·24	97·93
'86	96·22	92·28	100·05	99·58	97·81
'87 ...	95·30	100·17	103·90	99·87	100·37
'88	95·98	105·19	106·03	101·59	102·57
'89	95·17	115·21	110·20	103·94	106·18
1890	94·85	124·90	115·79	128·88	116·54
'91	93·80	120·13	120·27	132·07	118·00
'92	89·05	116·95	118·31	134·71	116·54
'93	90·31	114·60	119·12	137·64	117·52
'94 ...	91·97	120·06	121·67	139·09	120·05
'95	96·48	122·06	124·62	134·96	123·71
'96	97·04	141·96	126·15	155·73	130·89
'97 ...	98·73	150·47	132·47	162·02	136·59
'98 .	102·07	162·99	140·75	182·08	147·97
'99 ...	101·93	186·08	143·73	182·93	152·82
1900 ...	101·06	192·79	148·89	197·07	159·47
'01	101·94	162·67	151·00	201·32	156·67
'02	99·52	179·57	156·11	190·93	157·80
'03	100·78	197·80	161·90	200·72	165·78
'04 ...	103·32	211·09	165·74	206·98	171·33
'05	102·44	220·64	175·10	217·92	179·26
'06	102·55	246·76	183·19	230·01	189·79
'07	103·93	258·64	187·37	237·03	195·38
'08	101·37	220·61	181·54	244·13	187·41

I will deal in the following paragraph with the variations in the general index numbers, and place them parallel with the general commercial movement and the history of crises. But before doing this it is opportune to consider the indices by groups, and to compare their respective variations.

A first examination dealing with the basal year 1884 shows clearly, on consulting the table of index numbers by groups (Table B), that the years immediately preceding 1884 were more favourable, whereas those following 1884 were less prosperous, and that this period covers two or three years. It therefore follows that 1884 is a good point of departure for the comparison, as this year marks a transition between a period of depression and a period of expansion. Thus, all the figures of 1883 are higher than those of 1884, whereas all the figures of 1885 are lower; 1886 was a particularly bad year as regards production. The index number of this year is 7·72 per cent. below that of 1884, and 17·85 per cent. below that of 1882, which marks the summit of the period of expansion preceding the basal year (1884). In examining further on in this Paper (section 8) the economic crises in Belgium, I shall have occasion to refer to these phenomena in more detail.

The index numbers relative to population and to morals (Group 1) are divided into three distinct parts. The first, which covers the period from 1880 to 1884, is equal or above 100; the second covering the years 1885 to 1897, is below 100; and the third, which starts from 1898, is above 100, with the exception of a slight fall in 1902. Generally, this series is characterised by a condition of relative equilibrium, which is in conformity with its nature, since the phenomena which are depicted therein are not susceptible to indefinite increase. This relative regularity, however, is not completely beyond the influence of economic conditions, especially as regards certain elements.

The second group relates to production. 1884 marks an intermediate stage; the index number weakens in 1885 and 1886, recovers its equilibrium in 1887, ceases to rise from 1891 to 1894, rises rapidly from 1896 to 1900, falls in 1901 and 1902, and then rises continuously until 1908, this last point, by the way, being equal with 1905.

The third and fourth groups constitute series which are frankly dynamic, and of which the progression is occasionally retarded or thrown back by economic disturbances.

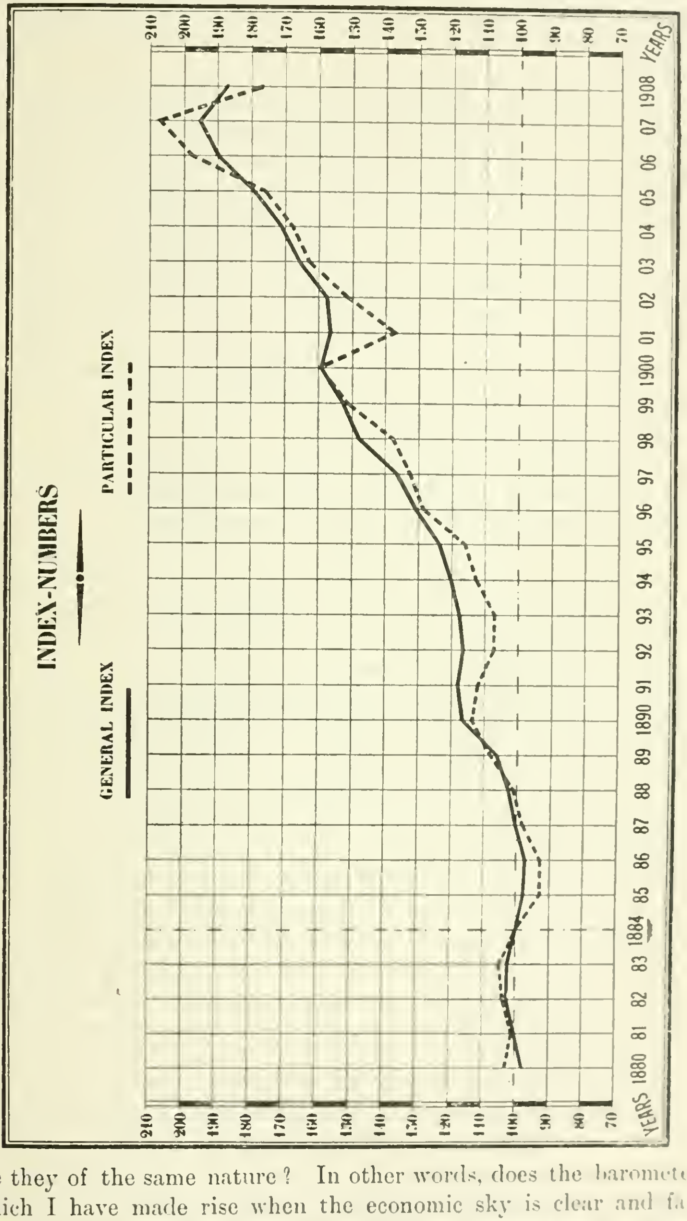
The character of each series is brought out better by the perusal of the following table:—

Periods.	Index by groups.			
	I.	II.	III.	IV.
1880-84	102·05	105·01	99·41	99·19
'85-89.	96·32	101·19	103·52	100·64
'90-94........	91·99	120·04	119·03	134·48
'95-99.	99·25	152·71	132·94	165·34
1900-04	101·32	188·78	156·73	199·40
'05-08........	102·60	189·33	181·80	232·28

8. *The general index number and crises.*

If the elements forming the index number have been well chosen and the basal year judiciously selected, we should expect to see the index number rise and fall in harmony with general economic conditions.

It will be seen in Table B that the general index number undergoes some more or less strong fluctuations, but do they correspond as regards time with well defined economic conditions and



are they of the same nature? In other words, does the barometer which I have made rise when the economic sky is clear and fall with bad weather? And, finally, if this is so, is the regularity of its oscillations sufficiently great to allow one to infer that in the future its oscillations will correspond with similar phenomena? Such is the question we have to examine here, and it is the essential question which is the motive of and dominates the whole of this enquiry.

We have not to expose the theory of crises, nor to draw attention to the features by which trade depressions are characterised. I will confine myself to remarking that according to general opinion economic crises are made up of four distinct periods:—(1) a period of prosperity, (2) a period of decline, (3) a period of depression, and (4) a period of recovery. The cycle is invariable, but the duration of each period is essentially variable. If the general index which I have compiled be examined it will be found to contain traces of the fluctuations of the nature of those I have just enumerated; but we cannot from this conclude with precision as to critical periods corresponding with the economic development of Belgium, for this would be begging the question.

I will follow a more rigorous method of verification by endeavouring to find if the depressions of the corresponding index fell at times of economic crises which have been recorded.

According to M. Jean Lescure, who in his book, "Des crises "générales et périodiques de surproduction," has made a careful study of these great economic movements, the years which preceded 1884 were characterised as follows:—After the boom of 1873, whose dominant feature was the great rise in prices, principally for the products of the mining and metallurgical industries, prices fell to such a degree that no former crisis equalled it in intensity. The crisis of 1873 was not only a crisis of prices, but at the same time a crisis for credit and for the Stock Exchange. The depression reached its culmination in 1878-79. It was felt most severely in the United States and in Germany, that is, in the two great countries which were about this period undergoing their industrial evolution. The fall in prices was general; the period known as the *period* of *low prices* dates from 1873, and it was to endure for many years. France and England did not escape the effects of this crisis, though they were not so severely affected as other industrial nations. After the period of stress from 1873 to 1879, an upward movement began which was particularly accentuated in France. It was, however, somewhat artificial, owing to the execution at that period of large public works in France, which were in fact the cause of the upward movement. The increase in the length of the more important French railways reached 5,141 kilometres from 1879 to 1882, and those of local interest were also largely developed. The United States also launched out in this direction, constructing 4,721 miles in 1879, 7,174 in 1880, 9,789 in 1881, and 11,596 in 1882, the mileage falling to 6,735 in 1883, and even to 3,131 in 1885. Prices generally showed firmness, but the depreciation of silver and the demand for gold from countries which, like Germany, Holland, and the Scandinavian States, had since 1873 reformed their monetary systems, caused a pronounced appreciation of gold which offered a powerful break to the increase of prices. These rose somewhat, but only in a measure. Mr. Sauerbeck's index numbers, which were 83 in 1879, rose to 88 in 1880, and remained at 85 and 84 in 1881 and 1882, to fall to 82 in 1883 and 76 in 1884. There was, therefore, a slight upward movement from 1879, and the period 1880-82 was favourable relatively to that period which preceded it (1878-79), and in relation to 1884 which marked a new period of decline.

It is now interesting to endeavour to ascertain if the index number which I have established reflects these economic oscillations. The situation of Belgium, a small country as regards consumption, but a large producer and exporter in relation to its geographical and political importance, would seem to be influenced directly by the economic movements of its big neighbours, England, France and Germany.

Year.		Index number.	Groups.			
			I.	II.	III.	IV.
1880	Rise	97·72	103·90	—	98.58	92·04
'81		100·29	105·10	102·18	98·50	97·42
'82	Expansion	102·53	100·69	110·13	98·99	104·05
'83		102·40	100·58	107·76	100·98	102·45
'84...	Decline	100·00	100·00	100·00	100·00	100·00

It can clearly be seen from the above, that 1880 is the starting point of a situation which went on improving in 1881 and reached its maximum in 1882, especially as regards the industry of the means of production largely represented in Group II. This situation is prolonged during 1883. 1884 is less favourable. These figures entirely confirm the description of the economic conditions of 1880 to 1884, which were sketched further back in the paper, and they show that the index has worked perfectly. The first result is so far favourable, inasmuch as it proves that the basal year chosen answers to the conditions required: it is neither a year of extreme depression nor of great expansion.

In Belgium the crisis was felt with grave intensity in 1885. A fall in wages which was one of its consequences and intense political feeling led to serious popular disturbances. The situation in 1886 was, if anything, worse. The year 1886 was, for Belgium, one of the most critical in its existence. Not only was business generally in a very depressed state, but the foundations of social order were shaken. The index number reflects this situation by falling to 97·93 in 1885 and to 97·81 in 1886. These two figures, however, hardly express the intensity of the crisis, and a few details are desirable. The marriage rate in 1886 in comparison with 1884 was only 99·0, which is the lowest figure recorded during the twenty-nine years under review in this paper.

The production of coal, iron, cast-iron and steel during this year was the lowest on record. Imports lost $8\frac{3}{10}$ and exports $13\frac{5}{10}$ compared with the basal figures. The goods traffic on railways showed a reduction. The number of telegrams dealing with commercial matters, the amount of bills discounted by the National Bank, the consumption of luxuries, the average wage of miners, the amount of the *droit de patente* (business tax) collected from joint stock companies have never reached a lower level than was the case in 1885 or 1886. This period was truly disastrous, and has left an ineffaceable impression on the memories of those who lived through it.

The intensity of the crisis, by depriving capital of remunerative employment, contributed to its being sent abroad. England, since 1886, had begun to interest herself in foreign enterprises, especially in Argentina. In the same year there was a vigorous recovery in the United States, where numerous new enterprises were started. The demand for iron, cast-iron and steel was extremely brisk in England to satisfy the wants of foreign customers. Germany also maintained her progress towards becoming a great industrial nation. M. J. Lescure, from whose book I quote again, says, "The "period 1887–1890 presents all the features characteristic of a "period of world-wide activity. . . . The upward movement "of 1887–1890 resembled earlier ones. It would, therefore, of "necessity after a time . . . . be followed by a period of "depression. This proved to be the case, as witness the depression "of 1890 in England, and of 1893 in the United States."

In Belgium the fluctuations of the general index number indicate an analogous march of economic events. The figures are significant in this respect and I reproduce them below from 1885 :—

1885, depression	97·93	1889, rise	106·18
'86 ,,	97·81	1890, expansion	116·54
'87, rise	100·37	'91	118·0
'88 ,,	102·57	'92, decline	116·54

It must not be overlooked, however, that the general index number is the result of a series of combined forces, certain of which have the effect of retarding or diminishing the manifestation of others. We should not, therefore, be surprised if certain groups show signs of real depression before others. This is the case as regards the production of the coal mines, quarries, blast furnaces and steel works, which, after having increased from 1887 to 1890, receded in 1891. The figures relating to 1890 and to 1891 show a pronounced falling off in the last-mentioned year:—

Year.	Coal.	Quarries.	Iron and castings.	Steel.
	tons (000's).	francs (000's).	francs (000's).	francs (000's).
1890	20,366	39,280	122,675	31,278
'91	19,676	37,818	110,920	29,111

Group III (exchange), on the contrary, during 1891 continues its upward movement, which changes into a decline in the following year. This is apparent if the more important index numbers are examined:—

[000's omitted.]

Index numbers.		1890.	1891.	1892.
Imports (special trade)	francs	1 672,115,	1,799,815,	1,536,454,
Exports (special trade)	,,	1,437,024,	1,519,033,	1,369,440,
Shipping (marine)	tons, Moorsom	5,785,980	6,025,339,	5,782,157,
Railway receipts	francs	182,219,	183,588,	179,689,
Amount of bills discounted by the National Bank	,,	2,355,514,	2,512,884,	2,430,457,

It will be noted that all these numbers relate to commercial activities. Those relating to production show a general weakness in 1891, which indicates that the industrial crisis was well within that year, but commercial transactions continue to be active, and it is not until the following year, 1892, that they decline. In a country like Belgium, where commerce is of such importance, it would be undesirable to take into consideration only the productive industries in order to be able to appreciate the critical periods in the nation's economy. Commercial exchanges are also of undoubted interest.

This consideration justifies the method of working of the index number, which places in 1892 the beginning of the general decline of the prosperous period 1889-1891:—

	1890.	1891.	1892.
General index number	116·54	118·0	116·54
Principal commercial indices—			
Imports (special trade)	111·8	119·0	100·6
Exports (special trade)	102·4	107·1	95·6
Shipping (maritime)	142·1	148·0	142·0
Railway receipts	110·4	111·4	108·9
Amount of bills discounted by the National Bank	108·4	114·3	109·6

The rise of 1890 was neither remarkable nor of long duration; the crisis of 1891-92 also was neither acute nor prolonged. What happened in Belgium repeated itself in a general way in other countries. Lescure, whose historical study I am still following, notes, as I have also done, the slight improvement in affairs:—"With the crisis of 1882 we observe a noteworthy phenomenon: "the weak intensity and short duration of the rise. The crisis "of 1890 offers an analogous peculiarity: a short rise and that of "slight intensity" (page 182).

1893 was no better than the preceding year; certain pathological indices, such as suicide, increased considerably, the quantity of coal extracted and the value of the production of iron and cast iron and exports were reduced; the consumption of luxuries, such as wine, was less; Belgian *rentes*, which had been forsaken for industrial and speculative investments, recovered the ground lost by the latter. On the other hand, certain symptoms, such as the slight increase in imports and in the tonnage of shipping and in the produce of the tax (*droit de patente*) levied on joint stock companies, showed that the crisis was nearing its end.

With the year 1894, in fact, an upward movement began which reached its maximum in 1900. This period of economic history is remarkable by its uniform character in all industrial countries. France, England, the United States and Germany all went through similar economic periods, and after having simultaneously reached their highest level of prosperity in 1900, manifested a simultaneous shrinkage in their commercial expansion in 1902. Belgium, though a small country in comparison with its powerful neighbours, also suffered. The general index number shows these oscillations clearly:—

1893, crisis	117·52	1898, expansion	147·97
'94, rise	120·05	'99 ,,	152·82
'95 ,,	123·71	1900 ,,	159·47
'96 ,,	130·80	'01, crisis	156·67
'97, expansion	136·59		

The period of nine years here under review is one of the most remarkable that can be studied, and for several reasons. First of all, economic conditions remained favourable for seven consecutive years, a circumstance which had not occurred for some time past. Further, economic progress showed itself in numerous domains with an intensity greater than had previously been observed. From 1894 to 1900 the index number changed from 120·05 to 159·47, an increase of 39·42 per cent., whereas during the eight years 1884-1891 the increase was only 18 per cent.

In the paper read in 1909 before the International Statistical

Institute, at its meeting in Paris, Professor Lexis, of Göttingen, remarked that "industrial production, considered in its final "technical phases, such as spinning and weaving, exacts a "preparatory production which is furnished by many other "industries which may be called fundamental industries, including "the mineral and metal industries, and especially the iron industry "in all its degrees from the rough castings to finished machinery of "all kinds. It is these industries which furnish the means of production and transport, and when it is a question of extending the "manufacture of articles for consumption, we must first of all "enlarge the scope of preparatory production."[15]

The remarks of Professor Lexis apply with truth to Belgium, as will be seen by the following figures :—

[000's omitted.]

		1894.	1895.	1896.	1897.	1898.	1899.	1900.
Coal mines	tons	20,535,	20,458,	21,252,	21,492	22,088,	22,072,	23,463,
Iron and castings	francs	98,417,	95,931,	115,585,	125,115.	123,887,	150,840,	161,546,
Steel	,,	40,200,	42,419,	63,129,	69,828,	76,610,	96,154	104,924,

It will be noted especially from this table that the production of steel has largely increased since 1894.

The special index number of Group II, which, besides these elements, comprises also the value of the production of quarries, and of zinc, lead and silver, as well as the number of steam engines and their horse-power, shows a similar movement (1884 = 100).

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Index numbers	120·06	122·06	141·96	150·47	162·99	186·08	192·79

I will quote again from M. Lescure's book in regard to the period of expansion which was beginning :—

"Towards 1895," he says, "the elimination of producers whose "machinery was out of date or of insufficient power was realised, "the rate of interest and wages had fallen, and the costs of production had been considerably reduced. In the United States and "Germany new economic forms of production (trusts and cartels) "had come into general use. The economic world was ready for a "new upward movement" (page 216).

"The improvement in trade was felt in England, France and "especially in Germany. The rise in Germany was most pro-

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[15] Lexis, "Les crises économiques." *Bulletin de l'Institut international de statistique.* Tome 18, livraison 1, p. 174. Paris, 1909.

"nounced and presented all the features of previous periods of "prosperity: development of production, of consumption, of "circulation, and of the distribution of wealth, as a result of a flow "of savings towards industry and of a rapid creation of the means "of production" (*Id.* p. 279).

Belgium passed through the same phases. Before analysing these different phenomena, it will be useful to see what is the interpretation reflected by the different economic factors either in the general index number or in the index numbers relating to each group:—

	1894.	1895.	1896.	1897.	1898.	1899.	1900.
General index number	120·05	123·71	130·89	136·59	147·97	152·82	159·47
Group I	91·97	96·48	97·04	98·73	102·07	101·93	101·06
,, II	120·06	122·06	141·96	150·47	162·99	186·08	192·79
,, III	121·67	124·62	126·15	132·47	140·75	143·73	148·89
,, IV	139·09	143·96	155 73	162·02	182·08	182·93	197·07

It may be useful to show by a few concrete examples the extent of the economic progress of Belgium from 1895 to 1900:—

[000's omitted.]

	1895.	1900,
Coal, number of tons extracted	20,458,	23,463,
Quarries, value of output	40,974,	56,300,
Iron, castings and manufactured	95,931,	161,547,
Steel, value of production	42,419,	104,925,
Zinc, lead and silver, value of production	46,131,	95,940,
Steam horse-power, number	1,091,	1,389,

The increase in the consumption of the following articles was also considerable:—

		1895.	1900.
Wine	number of hectolitres	264,020	311,090
Tobacco	number of kilogrammes	12,967,033	17,521,815
Beer	number of hectolitres	12,313,292	14,760,897

The following figures show the activity that prevailed in commerce and exchange:—

[000's omitted.]

		1895.	1900.
Imports (special trade)	francs	1,680,408,	2,175,497,
Exports (special trade)	,,	1,385,439,	1,879,878,
Navigation (maritime)	tons, Moorsom	6,858,	8,501,
Railway receipts	francs	176,058,	237,324,
Bills discounted by the National Bank	,,	2,894,250,	3,442,890,

After the great prosperity of this period, of which 1900 reached the maximum, a severe crisis followed in 1901. It was felt if anything with greater severity in Belgium than elsewhere, owing to the considerable Belgian interests in Russia, where the crisis was first felt.

The crisis on the Stock Exchange aggravated the industrial crisis. The estimates of M. de Laveleye in the *Moniteur des intérêts matériels* are suggestive in this respect. "It was on "March 31, 1900, that for the last time our table showed a rise on the "whole of the market quotations. The figure was then 8,974 mil-"lion francs. After deducting the new capital created we arrive at "the fact that on June 30, 1901, the total was 7,736 millions, or "1,238 millions less than on March 31, 1900, or a fall of 14 per cent. "From July 1 to September 30 of the same year there was a further "fall of 233 million francs. The market refused to accept new "securities, with the result that during three months new introduc-"tions and increases in capital only amounted to 26 million francs."

The counter effects of the crisis were felt in all directions: increase in the number of suicides, fall in the number of marriages, reduced coal output, fall in the values of the production of iron, steel, zinc, &c. Exports fell, as well as the goods traffic on railways and the amounts deposited at the National Bank. In fact, the disastrous effects of the crisis were felt on all sides A more detailed study of its results can be obtained from the table given in the appendix.

For the first time I am using an index number dealing with the life of the working classes, namely, statistics of strikes. As regards these statistics, the question has been discussed whether within a certain measure they can furnish indications of the economic activity of a country, and it has been given as a conclusion that strikes are more numerous in prosperous years than in years of depression. This conclusion, when expressed in so absolute a manner, is lacking in accuracy and precision. Strikes have not always an economic objective: many of them are caused by circumstances of a passing nature; such were the strikes in Belgium which coincided with the coming into operation of the new law on "règlements d'atelier." In France also, the law enforcing a weekly day of rest caused numerous labour conflicts. Strikes, while having an economic object, may be quite independent of the state of prosperity or depression of a country; such, for example, are the strikes whose aim is the development of trade unionism. It is otherwise as regards strikes brought about by questions of wages. One can understand that economic conditions exercise an economic influence on wages. During prosperous years employers are able to pay higher wages, but as they are generally careful not to take the first step in this direction we find many strikes for higher wages; on the other hand, the employers who have to reckon with the manual workers are not tempted to reduce wages, so that strikes in opposition to a reduction of wages are very few. During years of depression, however, we find a situation which is diametrically opposite.

The observation of the facts confirms this theory, as will be seen from the following figures taken from the statistics of strikes published under the supervision of the Belgian Labour Department:—

Year 1900.	Demand for increase of wages	99 strikes 26,089 strikers
,,	Opposition to reduction of wages	3 strikes 120 strikers
Year 1901.	Demand for increase of wages	41 strikes 3,431 strikers
,,	Opposition to reduction of wages	25 strikes 30,698 strikers

These figures characterize the situation perfectly. Instead of 26,000 workmen who took the initiative in the strikes for an increase of wages in 1900, a prosperous year, we find 30,000 who in 1901, a year of depression, struck in defence of their wages. If we take strikes as an index number, it must be those dealing with wages, and these must be divided into two groups whose signification is entirely different—offensive and defensive.

If the crisis of 1901 was violent it was not of long duration; already by the end of the year it had nearly passed from the Stock Exchange. The table of securities quoted on the Stock Exchange for the last quarter of 1901, drawn up by M. de Laveleye, showed a value in excess of the former one. The situation did not actually improve, however, and it remained stationary during the early months of 1902. But a new period of prosperity was coming. Its progress was slow at first, and then very rapid up to the time when a fresh period of depression set in.

The following index numbers show the course of the movement:—

1901, crisis	156·67	1905, expansion................	179·26
'02 ,, ...	157·80	'06 ,, ...	189·79
'03, rise	165·78	'07 ,, ...	195·38
'94 ,, ...	171·33	'08, crisis	187·41

The economic history of the last years is faithfully reflected in these few figures. I regret that the delay in the publication of certain official statistics prevents my bringing my table down to a later date.

Immediately after the crisis of 1901, the industry of the means of production in Belgium showed improvement which increased as time went on, as will be seen from the following figures:—

[000's omitted.]

		1902.	1903.	1904.	1905.	1906.	1907.
Coal mines	tons	22,213,	22,871,	23,797,	23,255,	23,300,	24,365,
Iron and castings	francs	114,717,	125,475,	121,068,	127,238,	151,666,	164,054,
Steel	,,	94,765,	114,814,	126,391,	137,491,	169,046,	192,964,
Zinc, lead and silver	,,	81,913,	94,542,	111,397,	119,167,	129,904,	125,525,

The special index number of Group II, which, with the above elements, comprises others in themselves not without interest, shows this upward trend in a few significant figures:—

	1902.	1903.	1904.	1905.	1906.	1907.
Index number	179·57	197·80	211·09	220·64	246·76	258·64

The group of industries of means of production which we left at 179·57 in 1902, immediately after the crisis, rose, therefore, in six years to 258·64, thus gaining 79·07 points—that is, as much as was the increase from 1884 to 1902. After this it is superfluous to insist further on the exceptional character of the prosperity of the period 1902-1907.

Exchanges followed a parallel evolution. If we examine a few of the facts bearing on economic conditions, we can at once see how the situation had improved. I give below a table of the particular index numbers:—

	1902.	1903.	1904.	1905.	1906.	1907.
Imports (special trade)	138·7	149·8	155·0	166·6	184·2	203·7
Exports (special trade).....................	117·9	125·6	124·0	152·9	157·0	162·2
Navigation (maritime)	249·3	267·9	274·4	285·2	317·8	329·6
Railway receipts	146·0	152·0	157·5	167·9	175·0	178·1
Amount of bills discounted by the National Bank	138·8	145·3	142·2	150·6	164·1	169·8

The crisis showed itself even in 1907. Its general nature is attested by Lexis, who, in a paper read before the International Statistical Institute in 1909, said: "For nearly two years we have "been witnesses of a retrograde trade movement in all countries. "This movement started in America in October, 1907, with a crisis "of extraordinary intensity. England, and especially Germany, "felt the effects of this depression acutely; France was not affected "directly to any great extent, but she too suffered from the economic "depression which spread over the civilised world." It seems to me that Professor Lexis places the date of the beginning of the crisis a few months too late. The first months of 1907 were characterised by a very acute situation. Discount rates rose very high, especially in Berlin. In Belgium the average rate of discount for 1907 was 4·95 per cent., the highest on record since 1880. This fact shows that the large financial institutions feared a crisis. Moreover, the continuous and exaggerated rise in prices from the beginning of 1907 indicated that a period of reaction was approaching. This started in July. Mr. Sauerbeck's index numbers are very significant in this respect. Those I give below show the birth of the crisis and its progress.[16]

1907.

January	80·0	July	81·1
February	80·7	August	79·4
March	80·0	September	79·1
April	80·7	October	78·8
May	82·4	November	76·7
June	82·0	December	76·2

Thus 1907 marks at the same time the summit of the period of prosperity and the beginning of the crisis. While prices weakened, industrial production and a number of phenomena, a reflex of social and economic life, showed a backward movement. The index number of production, which was 258·64 in 1907, fell to 220·61 in 1908; imports fell from 203·7 in 1907 to 183 in 1908; exports from 162·2 to 144·7 over the same period; shipping was stationary, as were also many other economic symptoms too numerous to mention here. The consumption of beer was less (133·01 in 1907 and 129·1 in 1908) and that of wine (134·5 in 1907 and 131 in 1908); wages of miners were also reduced (161·6 in 1907 and 153·3 in 1908). The crisis of 1908 resembles that of 1901. It arose suddenly after an exceptional period of prosperity. As with the crisis of 1901, that of 1908 was of short duration; in 1909 an improvement set in which turned to a period of expansion and to a rise in prices in 1910.

9. *The particular index of crisis.*

In July, 1909, a special commission, called the "commission on economic crisis," which was appointed by the French Ministry of Labour and Social Providence, endeavoured to determine the symptoms of crisis that is to say, the starting point of phases of depression. Of the number of economic phenomena which were examined by the commission eight only were considered as being symptoms of crises. They are:—The periods of slackness in the English and French trades unions, the general increment of prices of raw materials and food products, and of the whole of other products, the total movement of the commerce of France, the fluctuations in coal consumption, the movement of the commercial (*portefeuille*) bills and acceptances of the Bank of France, the fluctuations in the metal reserve of this Bank, and railway traffic (tonnage carried and receipts).

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[16] *Journal of the Royal Statistical Society*, 1908, p. 132.

We cannot utilise an index number composed of these elements for Belgium. We have not the systematic records of prices; and the trade union movement is not of sufficient importance to be representative of the degree of employment among the working classes, nor is the metal reserve of the Bank of Belgium what it should be. However, while utilising certain of the index numbers recommended by the French Commission, I have been obliged to eliminate some and to add others. The index thus composed is called "The "Particular Index of Crises." If it corresponds with the economic conditions as shown by the General Index number we have a confirmation of the value of this index, as well as a favourable indication of the value of the particular index number.

The phenomena embodied in this particular index number are:—The relation of the number of marriages to the number of couples who have reached the legal marriage age, the quantity of coal extracted, the value of the production of iron and cast iron and of steel, the value of imports and exports (special trade), the amount of bills discounted by the National Bank (the whole made proportionate to the population), the goods traffic on railways (in relation to the length of railway in working order), and the average annual rate of discount, in relation only to that of 1884.

I give below the proportionate numbers relating to these index numbers. These calculations are taken from Table II of the General Index Number:—

	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Marriages .... number	104·0	104·5	102·5	103·0	100·0	100·5	99·0	105·0
Coal .... quantity	97·9	96·8	99·7	101·8	100·0	95·5	93·7	98·6
Iron and castings.... value	—	111·7	123·6	116·1	100·0	87·0	80·7	89·8
Steel .... ,,	—	97·6	120·4	115·5	100·0	74·7	76·0	102·1
Imports.................... ,,	123·7	118·3	115·3	110·1	100·0	92·4	91·7	97·2
Exports.................... ,,	95·1	100·8	101·4	101·6	100·0	88·7	86·5	89·8
Railways, goods.... weights	98·2	100·8	103·0	105·0	100·0	95·1	95·3	95·7
Bills discounted by National Bank } values	100·9	101·7	101·7	98·2	100·0	99·4	97·3	100·6
Discount .... rates	99·1	77·1	66·9	91·6	100·0	101·1	115·7	106·6
	718·9	909·3	934·5	942·9	900·0	834·4	835·9	885·4

	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Marriages .... number	104·0	106·1	108·5	109·6	112·6	111·6	111·1
Coal .... quantity	101·0	104·5	107·5	102·7	101·3	99·3	104·2
Iron and castings .... value	99·8	112·5	120·0	99·0	91·5	85·5	85·3
Steel .... ,,	104·1	134·8	144·6	133·1	125·0	129·3	178·7
Imports.................... ,,	102·2	103·6	111·8	119·0	100·6	102·0	101·2
Exports .... ,,	88·3	103·5	102·4	107·1	95·6	93·7	89·3
Railways, goods ... weights	110·1	115·5	115·2	114·7	112·2	119·4	123·2
Bills discounted by National Bank } values	99·4	102·1	108·4	114·3	109·6	109·8	112·6
Discount .... rates	100·0	91·9	103·0	109·6	118·7	114·8	109·6
	909·0	974·5	1021·4	1009·1	967·1	965·4	1015·2

	1895.	1896.	1897.	1898.	1899.	1900.	1901.
Marriages .... number	114·6	119·7	121·7	122·7	126·7	128·2	124·2
Coal .... quantity	102·3	104·9	104·6	106·1	104·8	112·3	104·7
Iron and castings.... value	81·8	97·3	104.0	101·6	122·3	132·0	82·4
Steel .... ,,	185·6	272·7	297·5	322·2	400·0	442·6	296·4
Imports.................... ,,	106·3	111·0	115·3	120·6	132·2	131·9	130·0
Exports.................... ,,	93·5	97·8	106·8	111·6	120·7	121·5	113·5
Railways, goods.... weights	114·3	120·9	110·9	117·2	140·2	148·0	145·8
Bills discounted by National Bank } values	126·0	119·7	123·9	126·7	134·3	143·7	138·4
Discount .... rates	121·7	114·5	109·6	108·2	81·9	77·8	102·2
	1046·1	1158·5	1194·4	1236·9	1363·1	1438·0	1237·6

	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Marriages .... number	120·7	116·6	120·2	117·6	119·7	119·2	115·7
Coal .... quantity	106·3	109·1	105·3	104·2	107·2	106·7	105·0
Iron and castings.... value	91·0	98·3	93·6	97·2	120·1	122·7	94·6
Steel .... ,,	385·6	461·6	500·1	539·9	655·2	740·0	523·6
Imports .... ,,	138·7	149·8	155·0	166·6	184·2	203·7	183·0
Exports .... ,,	117·9	125·6	124·0	132·9	157·0	162·2	144·7
Railways, goods .. weights	152·9	158·9	162·9	172·6	186·7	188·5	163·7
Bills discounted by National Bank } values	138·8	145·3	142·2	150·6	164·1	169·8	164·9
Discount .... rates	109·6	104·5	109·6	104·5	84·3	50·9	93·8
	1361·5	1469·2	1512·9	1586·1	1778·5	1863·7	1589·0

The index number formed with the help of these nine indices furnishes indications which it is interesting to compare with those of the General Index Number :—

Years.	Index numbers calculated on		Years.	Index numbers calculated on	
	9 indices.	43 indices.		9 indices.	43 indices.
1880	102·70	97·72	1895	116·23	123·71
'81	101·03	100·29	'96	128·72	130·89
'82	103·83	102·53	'97	132·71	136·59
'83	104·77	102·40	'98	137·76	147·97
'84	100·00	100·00	'99	151·45	152·82
'85	92·71	97·93			
'86	92·88	97·81	1900	159·78	159·47
'87	98·37	100·37	'01	137·51	156·67
'88	101·00	102·57	'02	151·28	157·80
'89	108·28	106·18	'03	163·24	165·78
			'04	168·10	171·33
1890	113·49	116·54	'05	176·23	179·26
'91	112·12	118·00	'06	197·61	189·72
'92	107·45	116·54	'07	207·08	195·38
'93	107·27	117·52	'08	176·55	187·41
'94	112·80	120·05			

The parallelism of the two curves is striking. The principal difference between them is that the particular index number is evidently more sensitive in times of crisis than the other. All sources of wealth are not affected by the effect of industrial crises, and those which are affected are not affected to the same extent. It is therefore natural that in times of crisis the general index number should show a resistance which is not found in the particular index number.

10. *Conclusion.*

An economic and social condition which results in a normal and balanced situation from the demographic and moral point of view in an increase in all industrial production, in a growth of commerce and consumption, is evidently a sign that such a condition is one of progress. No one, we think, can deny that such is a true statement as regards the situation of Belgium since 1884.

This progressive evolution has been resumed at different intervals of more or less duration, which show themselves on the upward curve of the economic progress of Belgium. I have shown that these depressions corresponded with the periods of economic crisis and that they faithfully reflected their effects.

This, I believe, is the principal lesson which can be learnt from the use of the total index number. I should add that this teaching is new, extensive, and of great utility. Benini, I think, exactly expresses the extent of studies of this nature when he says that the object of semiology is especially to observe and to calculate the changes which take place in the economic state of a nation. To discover the periods of economic depression, to measure their duration and intensity—such is the object of the total index number, which thus satisfies one of the demands most pressingly put forward by science and experience. It would not be wise to expect much more from the method which I have applied here. Were we to push our conclusions further they would be likely to lead us astray. We should not, above all, confuse the increase in economic activities of all kinds with the increase in the general well-being of a nation. This depends on intellectual and moral elements which cannot be weighed statistically. Social justice, which is one of its important elements, the equilibrium between all the intellectual and economic forces of the nation, cannot be measured by statistical methods, as can, for example, the railway receipts or the amount of bills discounted.

And without denying the value of scientific induction, I am not of opinion that our calculations will allow us to foresee what may happen in the future from what has happened in the past. Are we not dealing with matters of extreme mobility, and may not our most careful provisions be rapidly contradicted by the events themselves?

It is with the above reservations that it is desirable to use the General Index Number in order to appreciate the economic progress of Belgium from 1884 to 1908. These years present a picture of intense economic activity, of a true superabundance of vitality in various directions. Analysis cannot entirely take the place of the study of the elements of the index number which are brought together in the two tables. It permits, however, of singling out a certain number of essential facts.

If we examine the year 1907 we find that, in relation to 1884, certain index numbers, after having been made proportionate to the population or to other phenomena, have increased in the following proportions:—

Increases of over 100 *per cent.* (1884 = 100.)

Value of production of steel	740
Value of production of zinc, lead and silver	325
Horse-power of steam engines used in industry	236·5
Value of imports (special trade)	203·7
Tonnage of shipping	329·6
Transport of coal and coke on inland waterways	226·3
Number of passengers on railways	266·5
Number of commercial telegrams	207·7
Amount of bills collected by the post office	204·2
Amount of *droit de patente* on joint-stock companies	467·6
Deposits in savings banks	759

Increases of more than 75 per cent.

Goods transported on railways	188·5
Railway receipts	178·1
Postal circulation	197·4
Money orders and postal orders	183·9

Increases of more than 50 per cent.

Value of exports (special trade)	162·2
Amount of bills discounted by the National Bank	169·8
Average wage of coal miners	161·6

Increases of more than 25 per cent.

Recognition of natural children by marriage	126·8
Value of production of quarries	139·8
Number of steam engines	139·3
Consumption of beer	133·1
Wine delivered for consumption	134·5

The total, despite the reduction caused by the principal pathological index, closes at 195·38 in 1907 and at 187·41 in 1908, as against 100 in 1884.

It would be extremely interesting to see studies of this nature carried out in other countries than Belgium. The work requires time and patience, but one is amply compensated for the labour by that satisfaction which is the highest reward of scientific endeavour. It is in expressing the hope to see further investigations of this nature undertaken that I finish this essay, of the imperfections of which I am well aware, but of which I venture to say "ceci est une œuvre de bonne foi."

[The Paper was read by Mr. G. Udny Yule, Honorary Secretary.]

TABLE I.—*Absolute numbers for each year.*

Indices.		1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
I.—*Population and Indices of a moral order.*											
1. Legitimate births	units	158,580	161,644	162,066	160,518	161,734	159,903	159,918	160,017	160,250	159,939
2. Illegitimate ,,	,,	13,284	13,767	14,279	13,966	14,987	15,140	15,172	15,449	15,336	15,603
3. Deaths	,,	123,323	117,007	114,298	119,196	121,070	117,775	124,904	115,296	121,097	119,726
4. Suicides	,,	591	550	595	599	596	670	629	766	699	749
5. Marriages	,,	38,926	39,487	39,214	38,666	39,205	39,910	39,042	42,491	42,427	43,759
6. Recognition of natural children by marriage	,,	2,094	2,375	2,173	2,162	2,215	2,337	2,425	2,458	2,349	2,476
7. Number of convictions for crimes (Assize and Correctional Courts)	,,	1,854	2,082	2,295	2,280	2,160	2,130	2,662	2,575	2,605	2,582
8. Number of convictions (Correctional Courts) for crimes under the penal code	,,	24,287	25,470	26,601	26,961	27,203	27,664	28,961	29,789	29,397	30,217
9. Lunatics	,,	8,163	8,250	8,466	8,763	9,005	9,328	9,584	9,849	10,280	10,515
II.—*Production.*											
10. Coal mines	tons (000's)	16,867	16,874	17,591	18,178	—	17,438	17,286	18,379	19,218	19,870
11. Quarries	francs (000's)	—	38,818	42,297	43,089	—	32,746	32,307	33,213	33,379	36,537
12. Iron and cast iron	,,	—	114,091	127,731	121,493	—	93,360	87,119	98,048	110,547	125,310
13. Steel	,,	—	19,442	24,277	23,649	—	15,578	16,012	21,761	22,605	29,178
14. Zinc, lead, silver	,,	—	31,041	33,131	31,137	—	31,365	32,053	35,847	42,835	46,599
15. Number of steam engines	units	—	14,742	14,926	15,107	—	15,745	16,080	16,367	17,265	17,108
16. Horse-power of steam engines	,,	—	685,421	722,774	718,921	—	781,455	793,924	812,980	821,988	859,412
III.—*Exchange.*											
17. Imports (special trade)	francs (000's)	1,680,892	1,629,872	1,607,563	1,552,131	1,425,745	1,347,047	1,335,049	1,431,933	1,534,367	1,556,378
18. Exports ,,	,,	1,216,741	1,302,670	1,325,917	1,343,126	1,337,479	1,200,003	1,181,974	1,240,625	1,243,700	1,458,526
19. Shipping	tons	3,571,182	3,362,564	3,941,920	4,313,754	4,072,987	4,072,048	4,094,026	4,571,705	4,912,601	5,158,436
20. Transport of coal and coke on inland waterways	Tonnes kilometriques	162,336,500	146,374,862	143,091,452	147,402,162	142,766,032	161,194,795	167,221,252	186,608,005	179,844,411	180,212,189
21. Number of passengers on railways (State and private)	000's	54,014	54,659	58,527	60,312	64,462	65,522	65,877	68,829	73,360	76,277
22. Goods traffic, railways (State and private)	tons (000's)	36,700	38,044	39,928	40,913	39,389	37,860	38,042	38,378	44,202	46,584
23. Receipts of railways ,,	francs (000's)	152,559	151,956	158,883	162,172	159,056	157,002	151,674	160,920	169,650	177,144
24. Postal circulation, receipts from	,,	11,760	12,366	12,395	13,836	14,266	14,720	15,163	15,741	16,343	17,183
25. Number of telegrams (commercial)	000's	1,530	—	1,651	1,669	1,734	1,639	1,643	1,788	1,957	2,051

TABLE I.—*Absolute numbers for each year*—*Contd.*

Indices.		1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
I.—*Population and Indices of a moral order.*											
1. Legitimate births	units	161,349	165,910	161,782	166,976	165,150	167,204	172,023	175,102	175,869	179,349
2. Illegitimate ,,	,,	15,246	16,007	15,703	16,086	16,312	16,811	16,510	15,885	15,052	14,919
3. Deaths	,,	126,545	128,786	133,693	125,530	118,213	125,148	113,748	113,586	117,457	126,963
4. Suicides	,,	724	768	795	825	839	812	809	751	823	781
5. Marriages	,,	44,596	45,449	47,209	47,065	47,735	49,712	52,585	54,198	55,444	55,765
6. Recognition of natural children by marriage	,,	2,468	2,629	2,613	2,512	2,664	2,673	2,780	2,521	2,273	2,352
7. Number of convictions for crimes (Assize and Correctional Courts)	,,	2,686	2,647	3,134	2,971	2,892	2,486	2,410	2,547	1,568	1,718
8. Number of convictions (Correctional Courts) for crimes under the penal code	,,	30,127	32,690	36,570	34,701	32,972	31,547	34,216	32,890	31,922	34,701
9. Lunatics	,,	10,777	11,075	11,480	11,994	12,300	12,802	13,315	13,568	14,222	14,603
II.—*Production.*											
10. Coal mines	tons (000's)	20,366	19,676	19,583	19,411	20,535	20,458	21,252	21,492	22,088	22,072
11. Quarries	francs (000's)	39,280	37,818	38,442	41,433	38,280	40,973	44,874	49,204	52,799	55,448
12. Iron and cast iron	,,	122,675	110,920	103,595	97,925	98,417	95,931	115,585	125,115	123,887	150,840
13. Steel	,,	31,278	29,111	27,601	28,868	40,200	42,419	63,129	69,828	76,610	96,154
14. Zinc, lead, silver	,,	55,157	57,728	53,638	46,133	42,716	46,130	54,251	58,346	78,057	95,940
15. Number of steam engines	units	18,113	18,304	18,831	18,926	19,647	19,664	20,125	20,844	21,556	22,400
16. Horse-power of steam engines	,,	903,833	936,846	993,307	1,032,492	1,062,876	1,090,922	1,127,468	1,208,479	1,249,813	1,312,319
III.—*Exchange.*											
17. Imports (special trade)	francs (000's)	1,672,115	1,799,815	1,536,454	1,575,139	1,574,549	1,680.408	1,776,732	1,873,011	1,984,556	2,197,209
18. Exports ,,	,,	1,437,024	1,519,033	1,369,440	1,355,945	1,303,686	1,385,439	1,467,944	1,626,372	1,719,951	1,882,265
19. Shipping	tons	5,785,980	6,025,339	5,782,157	6,001,968	6,513,730	6,858,237	7,483,206	7,971,950	8,233,700	8,632,626
20. Transport of coal and coke on inland waterways	Tonnes kilometriques	178,119,109	184,695,031	200,610,754	201,594,004	218,183,496	214,394,882	232,263,053	229,133,807	216,751,538	235,412,880
21. Number of passengers on railways (State and private)	000's	82,389	86,540	88,257	92,147	96,939	99,560	106,832	111,353	116,482	129,036
22. Goods traffic, railways (State and private)	tons (000's)	47,032	46,753	45,834	48,716	50,426	47,152	49,670	45,921	47,931	57.731
23. Receipts of railways ,,	francs (000's)	182,219	183,588	179,689	186,573	194,567	176.058	185,643	211,197	215,030	226,469
24. Postal circulation, receipts from	,,	17,756	18,262	18,647	19,002	19,842	20,607	21,301	22,358	23,611	25,683
25. Number of telegrams (commercial)	000's	2,454	2,552	2,579	2,514	2,515	2,699	2,770	2,929	3,473	3,822

TABLE I.—*Absolute numbers for each year—Contd.*

Indices.		1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
I.—*Population and Indices of a moral order.*										
1. Legitimate births	units	179,352	185,940	182,304	179,414	179,093	176,028	174,338	173,134	179,509
2. Illegitimate ,,	,,	14,437	14,037	13,767	12,887	12,628	12,409	11,933	12,004	11,325
3. Deaths	,,	129,046	116,077	119,330	118,675	119,506	118,343	118,884	115,347	121,964
4. Suicides	,,	786	859	872	818	878	918	848	826	970
5. Marriages	,,	57,711	57,131	56,157	51,946	56,740	56,679	58,388	58,660	57,564
6. Recognition of natural children by marriage	,,	2,233	2,499	2,316	2,245	2,271	2,222	2,182	2,250	2,018
7. Number of convictions for crimes (Assize and Correctional Courts)	,,	1,765	1,943	2,123	2,147	1,990	2,001	2,185	2,018	1,929
8. Number of convictions (Correctional Courts) for crimes under the penal code	,,	34,973	37,155	37,282	36,899	31,998	32,671	35,633	36,913	35,730
9. Lunatics	,,	14,974	15,348	15,982	16,353	16,729	16,944	17,210	17,504	17,690
II.—*Production.*										
10. Coal mines	tons (000's)	23,463	22,213	22,877	23,797	23,255	23,300	24,220	24,365	24,207
11. Quarries	francs (000's)	56,300	53,874	56,766	58,700	64,067	63,238	62,274	65,356	62,874
12. Iron and cast iron	,,	161,546	102,429	114,717	125,475	121,068	127,238	151,666	164,054	127,467
13. Steel	,,	104,924	71,870	94,765	114,814	126,391	137,491	169,046	192,964	137,834
14. Zinc, lead, silver	,,	84,650	79,777	81,913	94,542	111,397	119,167	129,904	125,525	116,421
15. Number of steam engines	units	22,961	24,106	24,586	25,258	25,679	26,052	26,462	27,124	27,546
16. Horse-power of steam engines	,,	1,388,941	1,554,157	1,639,606	1,713,684	1,825,634	1,946,496	2,064,566	2,210,147	2,348,493
III.—*Exchange.*										
17. Imports (special trade)	francs (000's)	2,175,497	2,178,674	2,357,995	2,578,581	2,701,923	2,940,221	3,332,487	3,673,914	3,296,052
18. Exports ,,	,,	1,879,878	1,784,160	1,881,213	2,026,797	2,027,875	2,199,142	2,626,226	2,742,688	2,470,505
19. Shipping	tons	8,500,772	9,288,200	10,154,300	10,910,652	11,176,239	11,615,856	12,945,568	13,465,447	13,409,331
20. Transport of coal and coke on inland waterways	Tonnes kilo-metriques	251,680,802	224,993,297	249,627,127	290,488,140	302,922,091	317,161,989	315,749,035	323,908,784	319,656,095
21. Number of passengers on railways (State and private)	000's	139,138	139,796	142,491	148,919	152,865	163,422	169,840	181,216	176,822
22. Goods traffic, railways (State and private)	tons (000's)	60,914	59,850	62,804	65,317	66,690	70,880	77,043	78,360	—
23. Receipts of railways ,,	francs (000's)	237,324	231,154	242,325	252,402	260,707	278,489	291,973	299,128	—
24. Postal circulation (receipts from)	,,	26,410	27,316	28,254	29,508	30,900	33,224	34,505	35,613	—
25. Number of telegrams (commercial)	000's	3,499	3,775	3,710	3,704	3,908	4,452	4,244	4,555	4,324

Table I.—*Absolute numbers for each year—Contd.*

Indices.		1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
III.—*Exchange—Contd.*											
26. Amount of bills discounted by the National Bank	francs (000's)	1,994,612	2,034,228	2,059,062	2,012,426	2,071,683	2,088,635	2,059,295	2,153,774	2,167,321	2,228,110
27. Bills collected by the Post Office, receipts from	francs	343,383	392,135	441,260	476,389	508,134	518,477	532,903	571,053	610,641	645,102
28. Money orders and postal orders, receipts from	,,	371,697	400,825	427,166	450,263	449,714	473,131	489,010	507,212	527,380	545,946
29. Mean rate of discount	per cent.	3·35	4·08	4·42	3·60	3·32	3·28	2·80	3·10	3·32	3·59
30. Number of bankruptcies	units	618	531	550	631	655	593	660	636	678	652
31. Price of principal agricultural products in the chief markets of Belgium:—											
Oats	100 kilos.	19·74	19·80	18·68	17·69	17·53	17·29	16·20	13·83	14·32	14·57
Wheat	,,	28·56	28·55	27·11	21·46	21·91	19·89	18·83	19·16	19·47	18·41
Barley	,,	21·60	21·08	21·09	19·24	18·64	17·48	15·65	15·73	16·97	16·06
Rye	,,	22·24	22·92	18·20	17·34	16·72	15·79	14·21	13·42	13·81	13·26
Linseed	,,	34·80	32·90	32·32	28·64	27·61	28·60	28·90	27·03	25·45	26·04
Potatoes	,,	10·34	7·34	9·0	10·09	6·51	6·07	6·32	6·99	8·75	8·20
Hay	,,	11·22	11·40	9·65	4·91	7·93	7·09	7·57	7·62	8·46	7·22
Butter	per kilo.	3·22	3·24	3·11	3·16	2·82	2·65	2·65	2·61	2·61	2·59
IV.—*Consumption.*											
32. Consumption of beer	(000's)	9,303	9,383	9,165	9,395	9,800	9,175	9,561	10,211	10,231	10,685
33. ,, wine	hectolitres	204,686	189,060	206,907	184,109	203,059	198,230	182,662	191,737	202,091	203,738
34. ,, tobacco	kilos. (000's)	11,637	14,837	19,582	17,538	12,283	11,540	13,413	12,168	12,009	12,910
35. Average annual wage of miners	francs	920	931	926	1,006	914	812	783	815	869	932
35. Pawnbroking establishments, produce of yearly sales	,,	—	—	—	568,104	613,355	636,226	653,558	649,471	695,338	671,448
37. Legacy and succession duties	francs (000's)	396,575	447,536	384,577	341,458	369,072	366,570	367,744	401,767	388,630	346,593
38. Amount of "droit de patente" on Joint Stock companies, &c.	francs	1,348,060	1,519,452	1,673,723	1,656,868	1,502,040	1,311,067	1,410,264	1,391,809	1,503,456	1,543,147
39. Amount of "droit de patente" collected from other sources	,,	4,732,658	4,799,562	4,874,430	4,928,496	4,912,836	4,924,042	5,162,148	4,921,904	4,980,671	5,055,311
40. Cadastral value of house property	francs (000's)	134,638	137,354	139,840	142,525	144,914	147,143	149,410	153,771	155,917	158,243
41. Deposits in Savings Banks (less than 3,000 francs)	,,	47,136	52,885	61,320	67,738	77,907	89,793	—	—	—	—
42. Number of Savings Bank pass books (individuals)	—	197,956	232,054	322,256	367,276	402,836	410,040	481,071	542,057	593,979	652,322
43. Average price of Belgian 3 per cents.	—	84·12	85·44	84·41	82·09	84·0	88·98	94·44	92·70	92·99	93·72

TABLE I.—*Absolute numbers for each year—Contd.*

Indices.		1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
III.—*Exchange—Contd.*											
26. Amount of bills discounted by the National Bank	francs (000's)	2,355,514	2,512,884	2,430,457	2,463,634	2,546,142	2,894,250	2,785,613	2,922,219	3,026,959	3,242,276
27. Bills collected by the Post Office, receipts from	francs	674,380	696,940	704,254	716,159	736,878	750,909	793,205	831,770	882,066	935,432
28. Money orders and postal orders, receipts from	,,	552,041	577,640	590,601	598,941	619,591	628,867	653,882	693,449	697,071	703,689
29. Mean rate of discount	per cent.	3·22	3·0	2·70	2·83	3·0	2·60	2·84	3·0	3·04	3·92
30. Number of bankruptcies	units	614	577	673	663	623	544	548	539	—	601
31. Price of principal agricultural products in the chief markets of Belgium:—											
Oats	100 kilos.	16·30	16·66	14·86	16·40	14·39	13·31	15·08	15·99	16·93	16·70
Wheat	,,	19·74	22·90	19·40	15·52	13·61	13·98	15·47	18·03	20·55	16·19
Barley	,,	17·26	18·64	16·0	15·78	14·72	13·87	14·32	14·37	15·74	16·32
Rye	,,	14·80	19·26	16·44	12·85	10·89	10·81	11·12	12·35	14·31	13·75
Linseed	,,	27·04	29·14	27·65	28·60	26·45	21·96	20·90	21·85	24·76	26·78
Potatoes	,,	6·35	9·10	8·02	4·78	5·78	7·05	5·37	6·07	6·86	5·53
Hay	,,	5·91	6·93	8·39	11·14	8·30	5·03	5·00	5·92	5·57	5·36
Butter	per kilo.	2·45	2·65	2·79	2·73	2·53	2·45	2·46	2·53	2·56	2·59
IV.—*Consumption.*											
32. Consumption of beer	hectolitres (000's)	10,820	10,815	10,978	11,448	11,631	12,313	12,872	13,307	13,839	14,427
33. ,, wine	hectolitres	214,582	250,079	237,755	210,513	246,927	264,020	306,200	257,607	266,687	281,575
34. ,, tobacco	kilos. (000's)	12,961	12,974	12,900	13,877	13,870	12,967	15,395	14,990	14,792	16,186
35. Average annual wage of miners	francs	1,117	1,086	957	887	941	948	980	1,023	1,097	1,168
36. Pawnbroking establishments, produce of yearly sales	,,	685,846	651,964	639,490	658,187	607,038	572,859	567,219	557,495	567,430	573,760
37. Legacy and succession duties	francs (000's)	352,408	363,831	423,814	378,829	373,782	337,677	341,318	327,345	327,030	337,728
38. Amount of "droit de patente" on Joint Stock companies, &c.	francs	1,827,605	1,700,819	1,546,760	1,673,533	1,813,654	1,832,843	2,361,138	2,515,940	5,104,320	3,914,734
39. Amount of "droit de patente" collected from other sources	,,	5,065,246	5,093,353	5,253,973	5,269,072	5,305,851	5,349,988	5,453,498	5,559,186	5,663,576	5,757,747
40. Cadastral value of house property	francs (000's)	160,604	162,800	165,116	167,218	169,522	171,896	174,373	177,025	180,255	183,537
41. Deposits in Savings Banks (less than 3,000 francs)	,,	269,915	290,984	318,666	356,475	318,173	359,689	404,095	452,870	490,102	531,889
42. Number of Savings Bank pass books (individuals)	—	725,808	794,603	864,290	954,653	1,074,688	1,139,253	1,232,286	1,371,152	1,508,148	1,635,979
43. Average price of Belgian 3 per cents.	—	97·45	98·60	98·93	101·26	101·97	101·31	100·96	101·18	100·72	98·40

TABLE I.—*Absolute numbers for each year—Contd.*

Indices.		1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
III.—*Exchange—Contd.*										
26. Amount of bills discounted by the National Bank	francs (000's)	3,442,890	3,370,839	3,428,963	3,635,330	3,603,115	3,861,906	4,255,517	4,449,748	4,362,485
27. Bills collected by the Post Office, receipts from	francs	1,003,029	1,038,584	1,056,086	1,072,538	1,110,863	1,158,135	1,241,880	1,312,331	1,315,987
28. Money orders and postal orders, receipts from	,,	752,493	800,676	836,117	865,451	895,094	954,060	1,011,062	1,046,107	1,057,688
29. Mean rate of discount	per cent.	4·09	3·28	3·0	3·17	3·0	3·17	3·84	4·95	3·56
30. Number of bankruptcies	units	519	535	573	613	613	580	533	576	547
31. Price of principal agricultural products in the chief markets of Belgium:—										
Oats	100 kilos.	16·79	17.04	18·42	15·14	15·62	18·14	18·29	19·13	18·17
Wheat	,,	16·25	16·31	16·35	16·26	17·35	17·63	16·98	18·69	19·52
Barley	,,	16·37	15·61	15·79	15·19	14·95	16·09	16·58	17·88	17·73
Rye	,,	14·28	13·64	13·55	13·51	13·75	14·65	14·88	16·64	17·01
Linseed	,,	33·93	31·43	32·39	27·12	22·51	24·46	27·58	29·80	28·41
Potatoes	,,	5·81	6·47	6·57	9·0	7·67	8·16	8·33	7·72	7·82
Hay	,,	7·67	9·26	7·22	6·04	6·54	7·87	6·83	6·83	6·94
Butter	per kilo	2·77	2·75	2·71	2·75	2·74	2·80	2·91	2·87	2·90
IV.—*Consumption.*										
32. Consumption of beer	hectolitres (000's)	14,761	14,809	14,580	14,936	15,485	15,948	16,596	16,496	16,155
33. ,, wine	hectolitres	311,090	315,745	315,858	338,729	305,539	339,458	371,348	345,980	340,657
34. ,, tobacco	kilos. (000's)	17,522	17,506	16,732	17,196	20,082	20,734	19,046	17,949	20,011
35. Average annual wage of miners	francs	1,413	1,247	1,177	1,206	1,155	1,129	1,342	1,477	1,401
36. Pawnbroking establishments, produce of yearly sales	,,	539,755	578,663	663,301	653,150	620,399	612,578	569,924	610,940	—
37. Legacy and succession duties	francs (000's)	426,726	402,636	370,651	369,585	367,984	386,261	401,727	—	—
38. Amount of "droit de patente" on Joint Stock companies, &c.	francs	4,131,924	3,642,732	4,074,223	4,236,912	4,450,153	5,408,646	6,473,562	7,027,500	—
39. Amount of "droit de patente" collected from other sources	,,	5,767,283	5,859,152	6,222,240	6,244,249	6,427,425	6,714,852	7,011,268	7,349,976	—
40. Cadastral value of house property	francs (000's)	187,529	191,633	195,646	199,748	204,284	208,876	213,567	218,329	223,149
41. Deposits in Savings Banks (less than 3,000 francs)	,,	575,051	668,733	538,159	615,387	655,544	687,580	713,295	748,695	782,956
42. Number of Savings Bank pass books (individuals)	—	1,750,999	1,855,770	1,966,537	2,081,381	2,197,887	2,304,606	2,412,376	2,520,801	2,617,500
43. Average price of Belgian 3 per cents.	—	95·10	97·34	99·58	99·75	99·70	99·73	99·66	97·67	94·51

TABLE II.—*Proportional numbers for each year.*

Indices.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
I.—*Population and indices of a moral order.*															
1. Legitimate births	—	100·3	99·4	97·2	100·0	94·6	94·1	92·8	92·0	91·0	90·9	93·8	90·4	92·4	90·4
2. Illegitimate ,,	109·6	107·7	104·9	106·1	100·0	97·8	97·6	95·8	95·6	94·7	98·0	95·9	95·0	96·0	93·4
3. Deaths	93·2	100·0	103·3	100·5	100·0	103·8	99·0	108·1	105·3	106·2	100·5	100·0	97·1	104·3	110·5
4. Suicides	96·1	108·3	98·1	99·0	100·0	89·3	97·1	75·7	88·3	80·5	84·5	78·6	73·8	70·9	70·9
5. Marriages	104·0	104·5	102·5	103·0	100·0	100·5	99·0	105·0	104·0	106·1	108·5	109·6	112·6	111·6	111·1
6. Recognition of natural children by marriage	106·6	116·7	103·0	104·7	100·0	104·4	108·1	107·6	103·6	107·8	109·5	111·1	112·6	105·6	109·8
7. Number of convictions for crimes (Assize and Correctional Courts)	110·2	100·2	91·3	93·3	100·0	102·6	79·4	84·7	85·5	86·6	81·5	84·5	64·6	72·9	77·9
8. Number of convictions (Correctional Courts) for crimes under the penal code	106·5	103·1	100·0	99·8	100·0	99·7	95·9	91·0	96·6	94·5	94·4	86·7	74·5	82·2	88·9
9. Lunatics	105·0	105·1	103·7	101·6	100·0	97·63	95·82	91·0	92·9	89·1	85·9	84·0	80·9	76·9	74·8
Total	831·2	945·9	906·2	905·2	900·0	890·33	866·02	857·7	863·8	856·5	853·7	844·2	801·5	812·8	827·7
Index	103·9	105·1	100·69	100·58	100·00	98·93	96·22	95·3	95·98	95·17	94·85	93·80	89·05	90·31	91·97
II.—*Production.*															
10. Coal mines	97·9	96·8	99·7	101·8	100·0	95·5	93·7	98·6	101·1	104·5	107·5	102·7	101·3	99·3	104·2
11. Quarries	—	108·8	117·1	118·0	100·0	87·6	85·6	87·6	85·9	93·9	101·3	96·5	97·1	103·6	95·2
12. Iron and cast iron	—	111·7	123·6	116·1	100·0	87·0	80·7	89·8	99·8	112·5	120	99	91·5	85·5	85·3
13. Steel	—	97·6	120·4	115·5	100·0	74·7	76·0	102·1	104·1	134·8	144·6	133·1	125·0	129·3	178·7
14. Zinc, lead, silver	—	105·3	111·0	105·4	100·0	101·5	102·7	113·7	133·3	144·9	172·2	178·0	164·0	141·9	128·2
15. Number of steam engines	—	99·1	99·1	99·2	100·0	101·0	102·2	102·9	106·5	105·5	112·1	112·0	114·2	113·6	117·0
16. Horse-power of steam engines	—	96·0	100·0	98·3	100·0	104·5	105·1	106·5	105·6	110·4	116·6	119·6	125·6	129·0	131·8
Total	97·9	715·3	770·9	754·3	700·0	651·8	646·0	701·2	736·3	806·5	874·3	840·9	818·7	802 2	840·4
Index	—	102·18	110·13	107·76	100·0	93·11	92·28	100·17	105·19	115·21	124·9	120·13	116·95	114·6	120·06

TABLE II.—*Proportional numbers for each year—Contd.*

Indices.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
I.—*Population and indices of a moral order.*														
1. Legitimate births	90·4	92·1	92·4	91·6	92·3	94·4	95·7	92·3	89·6	88·3	86·4	83·8	82·3	81·1
2. Illegitimate ,,	91·5	96·4	102·1	107·6	110·2	113·1	118·5	118·5	122·5	123·9	123·9	126·1	125·1	127·9
3. Deaths	106·7	116·8	117·7	116·8	110·0	108·1	118·6	117·2	119·1	119·6	121·0	121·5	124·9	121·1
4. Suicides	87·4	77·7	89·3	79·6	87·1	86·4	78·6	77·7	86·4	79·6	75·7	86·4	91·9	72·8
5. Marriages	111·6	119·7	121·7	122·7	126·7	128·2	124·2	120·7	116·6	120·2	117·6	119·7	119·2	115·6
6. Recognition of natural children by marriage	114·1	113·9	107·4	102·2	107·4	104·6	119·6	115·5	117·8	121·7	121·1	123·7	126·8	120·5
7. Number of convictions for crimes (Assize and Correctional Courts)	96·2	100·5	96·5	137·0	131·9	129·5	123·6	117·7	117·7	124·7	125·2	119·3	126·3	130·2
8. Number of convictions (Correctional Courts) for crimes under the penal code	95·4	88·0	93·8	98·2	90·6	88·9	83·8	85·0	87·7	103·9	103·2	95·3	92·7	97·1
9. Lunatics	71·7	68·3	67·7	62·9	60·9	56·3	54·9	51·1	49·6	48·0	47·9	47·2	46·2	46·1
Total	868·3	873·4	888·6	918·6	917·4	909·5	917·5	895·7	907·0	929·9	922·0	923·0	935·1	912·4
Index	96·48	97·04	98·73	102·07	101·93	101·06	101·94	99·52	100·78	103·32	102·44	102·55	103·93	101·37
II.—*Production.*														
10. Coal mines	102·3	104·9	101·6	106·1	101·8	112·3	104·7	106·3	109·1	105·3	104·2	107·2	106·7	105·0
11. Quarries	100·1	108·2	117·0	124·0	128·7	131·7	121·0	128·9	131·6	141·8	138·3	134·0	139·8	133·3
12. Iron and cast iron	81·8	97·3	104·0	101·6	122·3	132·0	82·4	91·0	98·3	93·6	97·2	120·1	122·7	91·6
13. Steel	185·6	272·7	297·5	322·2	400·0	442·6	296·4	385·6	461·1	500·1	539·9	655·2	740·0	523·6
14. Zinc, lead, silver	136·3	158·2	167·9	221·8	269·6	239·6	222·3	225·1	256·5	298·4	315·4	340·1	325·5	298·7
15. Number of steam engines	115·1	116·4	118·7	121·4	121·8	128·9	130·0	134·0	135·9	136·4	136·7	137·4	139·3	140·1
16. Horse-power of steam engines	133·2	136·0	143·6	113·8	152·4	162·4	178·9	186·1	192·1	202·0	212·8	233·3	236·5	219·0
Total	854·4	993·7	1,053·3	1,110·9	1,302·6	1,349·5	1,138·7	1,257·0	1,384·6	1,477·6	1,544·5	1,727·3	1,810·5	1,541·7
Index	122·06	141·96	150·47	162·99	186·08	192·79	162·67	179·57	197·80	211·09	220·64	246·76	258·64	220·61

TABLE II.—*Proportional numbers for each year*—*Contd.*

Indices.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
III.—*Exchange.*															
17. Imports (special trade)	123·7	118·3	115·3	110·1	100·0	92·4	91·7	97·2	102·2	103·6	111·8	119·0	100·6	102·0	101·2
18. Exports ,,	95·1	100·8	101·4	101·6	100·0	88·7	86·5	89·8	88·3	103·5	102·4	107·1	95·6	93·7	89·3
19. Shipping	87·7	82·6	96·8	105·9	100·0	100·0	100·5	112·2	120·6	126·7	142·1	148·0	142·0	147·3	159·9
20. Transport of coal and coke on inland waterways	115·3	104·4	100·3	103·2	100·0	111·7	115·4	133·3	127·8	127·9	124·1	128·7	139·9	140·6	152·1
21. Number of passengers on railways (State and private)	89·0	88·5	92·3	94·6	100·0	100·6	101·9	104·9	111·9	115·5	123·3	129·7	132·1	137·9	144·6
22. Goods traffic, railways (State and private)	98·2	100·8	103·0	105·0	100·0	95·1	95·3	95·7	110·1	115·5	115·2	114·7	112·2	119·4	123·2
23. Receipts of railways (State and private)	102·1	99·7	102·0	103·0	100·0	97·7	94·1	99·3	104·6	108·7	110·4	111·4	108·9	113·0	117·6
24. Postal circulation, receipts from	86·4	89·8	88·9	98·1	100·0	102·0	104·0	106·9	108·8	114·4	118·6	120·7	122·0	123·1	127·5
25. Number of telegrams (commercial)	92·5	—	97·4	97·3	100·0	93·4	92·8	99·9	107·2	112·3	134·8	138·8	138·9	133·9	132·9
26. Amount of bills discounted by the National Bank	100·9	101·7	101·7	98·2	100·0	99·4	97·3	100·6	99·4	102·1	108·4	114·3	109·6	109·8	112·6
27. Bills collected by the Post Office, receipts from	70·8	79·8	88·8	94·7	100·0	100·8	102·6	108·8	104·1	120·5	126·6	129·3	129·4	130·2	132·9
28. Money orders and postal orders, receipts from	86·6	91·0	97·2	101·3	100·0	104·0	106·4	109·1	111·5	115·2	117·0	121·1	122·7	123·0	126·3
29. Mean rate of discount	99·1	77·1	66·9	91·6	100·0	101·1	115·7	106·6	100·0	91·9	103·0	109·6	118·7	114·8	109·6
30. Number of bankruptcies	102·1	116·6	115·4	103·5	100·0	108·7	104·2	103·1	97·9	103·3	109·1	115·1	104·0	105·6	111·9
31. Price of principal agricultural products in the chief markets of Belgium	129·2	128·0	117·4	106·5	100·0	94·7	92·3	90·6	96·1	92·0	90·1	96·5	98·1	92·5	83·4
Total	1,478·7	1,379·1	1,484·8	1,514·6	1,500·0	1,490·3	1,500·7	1,558·0	1,590·5	1,653·1	1,736·9	1,804·0	1,774·7	1,786·8	1,825·0
Index	98·58	98·50	98·99	100·98	100·0	99·35	100·05	103·9	106·03	110·2	115·79	120·27	118·31	119·12	121·67

TABLE II.—*Proportional numbers for each year—Contd.*

Indices.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
III.—*Exchange.*														
17. Imports (special trade)	106·3	111·0	115·3	120·6	132·2	131·9	130·0	138·7	149·8	155·0	166·6	184·2	203·7	183·0
18. Exports ,,	93·5	97·8	106·8	111·6	120·7	121·5	113·5	117·9	125·6	121·0	132·9	157·0	162·2	144·7
19. Shipping	168·4	183·7	195·7	202·1	211·9	208·7	228·0	249·3	267·9	274·4	285·2	317·8	329·6	329·2
20. Transport of coal and coke on inland waterways	150·6	133·2	171·1	172·4	164·5	175·9	157·2	174·4	203·6	211·6	221·6	220·6	226·3	216·4
21. Number of passengers on railways (State and private)	147·6	156·2	153·9	188·9	191·6	206·6	208·1	212·1	221·4	228·7	243·3	251·6	266·5	248·4
22. Goods traffic, railways (State and private)	114·3	120·9	110·9	117·2	140·2	148·0	145·8	152·9	158·9	162·9	172·6	186·7	188·5	163·7
23. Receipts of railways (State and private)	105·6	110·7	126·2	130·1	136·1	142·9	141·1	146·0	152·0	157·5	167·9	175·0	178·1	169·7
24. Postal circulation, receipts from	130·4	133·0	137·7	143·6	154·4	160·0	163·0	166·2	171·3	177·1	188·2	196·0	197·4	—
25. Number of telegrams (commercial)	140·4	142·3	147·0	173·7	189·2	174·4	185·3	179·5	177·0	184·3	207·4	195·6	207·7	195·3
26. Amount of bills discounted by the National Bank	126·0	119·7	123·9	126·7	134·3	143·7	138·4	138·8	145·3	142·2	150·6	164·1	169·8	164·9
27. Bills collected by the Post Office, receipts from	133·4	139·1	143·7	150·6	157·8	170·7	173·9	174·4	174·8	178·8	184·2	195·3	204·2	202·8
28. Money orders and postal orders, receipts from	126·1	129·5	135·4	134·5	134·2	144·7	151·5	156·1	159·5	162·8	170·1	179·7	183·9	184·3
29. Mean rate of discount	121·7	114·5	109·6	108·9	81·9	77·8	102·2	109·6	104·5	109·6	104·5	84·3	50·9	93·8
30. Number of bankruptcies	128·0	124·7	127·3	—	121·6	132·5	131·5	131·0	126·3	128·5	135·2	142·8	141·2	144·6
31. Price of principal agricultural products in the chief markets of Belgium	77·1	76·0	82·6	89·6	85·3	94·0	95·5	94·8	90·6	88·7	96·2	97·1	100·6	100·8
Total	1,869·4	1,892·3	1,987·1	1,970·5	2,155·9	2,233·3	2,265·0	2,341·7	2,428·5	2,486·1	2,626·5	2,747·8	2,810·6	2,541·6
Index	124·62	126·15	132·47	140·75	143·73	148·89	151·0	156·11	161·90	165·74	175·1	183·19	187·37	181·54

TABLE II.—*Proportional numbers for each year—Contd.*

Indices.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
IV.—*Consumption.*															
32. Consumption of beer	99·5	99·1	95·7	96·6	100·0	95·6	95·4	101·2	99·2	103·5	105·2	104·0	104·6	107·9	108·7
33. ,, wine	105·4	96·3	104·0	90·3	100·0	96·3	88·0	91·2	94·3	95·1	100·6	116·0	109·1	95·7	111·4
34. ,, tobacco	99·3	125·0	163·1	144·4	100·0	92·8	106·9	95·9	92·9	99·8	100·6	99·6	98·1	104·4	103·5
35. Average annual wage of miners	100·7	101·9	101·3	109·5	100·0	87·7	85·7	89·2	95·1	102·0	122·2	118·8	104·7	97·3	102·9
36. Pawnbroking establishments, produce of yearly sales	—	—	—	—	100·0	94·3	91·7	84·2	77·6	81·2	79·6	81·2	81·4	75·8	79·0
37. Legacy and succession duties	105·7	117·2	106·1	96·5	100·0	97·8	100·9	103·9	108·9	92·4	95·1	92·9	106·3	91·5	96·2
38. Amount of "droit de patente" on Joint Stock companies, &c.	89·7	101·1	111·4	110·3	100·0	87·3	93·9	92·6	100·1	102·7	121·6	113·2	102·9	111·4	120·7
39. Amount of "droit de patente" collected from other sources	100·0	101·2	101·5	101·9	100·0	99·1	102·8	97·1	96·3	97·7	98·4	97·7	99·9	99·1	99·0
40. Cadastral value of house property	97·3	98·2	98·7	99·6	100·0	100·3	100·9	102·7	102·3	103·7	105·5	105·9	106·4	106·6	107·2
41. Deposits in Savings Banks (less than 3,000 francs)	63·4	70·3	80·5	87·9	100·0	113·9	—	—	—	—	330·0	352·2	381·9	422·9	374·6
42. Number of Savings Bank pass books (individuals)	51·4	59·6	81·7	92·2	100·0	107·9	116·8	130·3	140·1	153·7	171·7	185·9	200·4	218·9	244·5
43. Average price of Belgian 3 per cents.	100·0	101·7	100·5	97·7	100·0	105·9	112·4	110·3	110·7	111·6	116·0	117·4	117·8	120·5	121·4
Total	1,012·4	1 071·6	1,144·5	1,126·9	1,200·0	1,178·9	1,095·1	1,098·6	1,117·5	1,143·4	1,546·5	1,584·8	1,616·5	1,651·7	1,669·1
Index	92·04	97·42	104·05	102·45	100·0	98·24	99·58	99·87	101·59	103·94	128·88	132·07	134·71	137·64	139·09
Grand total	3,420·2	4,111·9	4,306·4	4,301·0	4.300·0	4,211·33	4,108·12	4,215·5	4,308·1	4,459·5	5.011·4	5,073·9	5,011·4	5,053·5	5,162·2
Divisor	35	41	42	42	43	43	42	42	42	42	43	43	43	43	43
General index	97·72	100·29	102·53	102·40	100·0	97·93	97·81	100·37	102·57	106·18	116·54	118·0	116·54	117·52	120·05

TABLE II.—*Proportional numbers for each year—Contd.*

Indices.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
IV.—*Consumption.*														
32. Consumption of beer	113·4	116·9	119·3	122·5	126·3	130·2	128·5	121·8	126·2	129·2	131·5	135·3	133·1	129·1
33. " wine	117·1	131·2	111·4	113·6	118·8	132·2	132·2	130·5	138·2	122·8	135·0	146·2	134·5	131·0
34. " tobacco	95·3	111·6	107·2	104·5	113·0	123·3	121·3	114·3	115·9	133·7	136·4	123·9	115·5	127·6
35. Average annual wage of miners	103·7	107·2	111·9	120·0	127·8	151·6	136·4	128·8	132·0	126·4	123·5	146·8	161·6	153·3
36. Pawnbroking establishments, produce of yearly sales	85·8	92·3	97·0	93·5	95·8	101·0	102·2	92·0	93·5	100·0	103·2	106·3	104·0	101·2
37. Legacy and succession duties	92·3	88·1	92·9	93·0	92·9	108·5	100·8	103·1	100·0	100·0	104·4	109·6	120·8	—
38. Amount of "droit de patente" on Joint Stock companies, &c.	122·0	157·2	167·5	339·6	260·4	275·0	242·5	271·2	282·0	296·5	360·0	431·0	467·6	401·8
39. Amount of "droit de patente" collected from other sources	98·3	98·9	99·4	100·0	100·5	101·4	101·5	106·2	105·2	107·0	110·4	111·0	118·3	120·1
40. Cadastral value of house property	107·0	107·2	107·3	107·9	108·6	111·8	112·5	113·2	114·7	115·2	116·4	117·9	119·1	120·7
41. Deposits in Savings Banks (less than 3,000 francs)	416·7	462·5	510·6	545·6	585·6	638·0	730·0	579·0	654·2	688·0	713·2	731·8	759·0	787·2
42. Number of Savings Bank pass books (individuals)	255·3	272·6	299·0	321·9	348·4	375·7	392·1	409·6	428·0	446·3	462·1	478 7	495·1	500·9
43. Average price of Belgian 3 per cents	120·6	120·1	120·8	119·9	117·1	113·2	115·8	118·5	118·7	118·7	118·7	118·6	116·3	112·5
Total	1727·5	1868·8	1944·3	2185·0	2195·2	2361·9	2415·8	2,291·2	2,408·6	2,483·8	2,615·1	2,760·1	2 814·9	2,685·4
Index	143·96	155·73	162·02	182·08	182·93	197·07	201·32	190·93	200·72	206·98	217·92	230·01	237·08	214·13
Grand total	5319·6	5628·2	5873·3	6215·0	6571·1	6857·2	6737·0	6,785·6	7,128·7	7,377·4	7,708·1	8,158·2	8,401·4	7,683·7
Divisor	43	43	43	42	43	43	43	43	43	43	43	43	43	41
General index	123·71	130·89	136·59	147·97	152·82	159·47	156·67	157·80	165·78	171·33	179·26	189·79	195·38	187·41

DISCUSSION *on* M. JULIN'S PAPER.

MR. FLUX, in proposing a vote of thanks to the author, said he wished there had been selected to open the discussion someone who was more familiar than he was with the statistics of Belgium; such a person would have been qualified to direct attention to features brought out in the Paper with which he could not attempt to deal. They would all agree that the Paper contained a large amount of very interesting information with regard to the commercial and industrial progress of Belgium during the last thirty years; and they would all accord their best thanks to the author who had taken the trouble to compile all this information, to work it up and to reduce it to the intelligible shape of a simple series of index numbers in order that it might be more readily grasped by those who, through lack of familiarity with the facts, would otherwise find a difficulty in seeing what they led to. Some of the facts brought forward were worthy of particular attention because of certain curious features which they manifested. For example, one thing which struck him was that the special index numbers of nuptiality, set out on pages 287 and 288, showed a remarkable difference of level between the earlier part of the period and the latter half. Over the first two series of columns for the first sixteen years, especially the first eight, he found the numbers ranged between, the lowest point 99, and 105; but, in the fourth group of years, the last seven, the numbers ranged between 116 and 120. That difference of level between the earlier years in the table and the later years was a remarkable fact, as to the significance of which, if the author had been present, he would have been inclined to ask for some comment. There were one or two other points to which he might venture to refer, partly because the author himself directed attention to certain necessary defects in his statistics and in the method of handling them. The author told them that each individual index number had to be treated with care because of the special features surrounding each of the phenomena represented in it, but that he hoped by taking a large number of different indices to have overcome the difficulty arising from the lack of trustworthiness of each individual index number, as a precise measure of the variation of the phenomena to which it was related. He had, therefore, provided them with a basis of criticism which did not in the least weaken their appreciation of his work. In the same table as that already referred to there were a number of other index numbers, including two relating to the metals, iron and steel. The one relating to iron showed the expansion in the iron trade of Belgium to have accompanied that in other industrial countries, but the one relating to steel was very remarkable; it was to be found at the head of the last group, showing the highest increase but one—almost equal to that of the deposits in Savings Banks. But with regard to that number it was open to the suggestion that what was found there was not perhaps so much a change in the welfare of Belgium as a change in the general habit throughout the world as to the form in which iron was used for structural material: steel was the form now adopted generally for that purpose, whereas formerly a comparatively small proportion of iron was converted into steel. Consequently, that large increase in the use of steel reflected other changes besides the expansion of metallurgical industries, and could only doubtfully be regarded as a sound index of industrial progress. That point was of special importance in relation to M. Julin's own criticism of the materials and methods adopted. The author hoped to overcome the difficulty of special facts in various index numbers by using a large number of them; but this particular instance was one which had escaped his capacity for handling the machinery in that fashion. In the last two years the index numbers were 740 and 523 respectively, showing a reduction of over 200. The aggregate reduction in the particular index number of crises was only 274; and if they turned to the aggregate index number of the whole 43 commodities, they found there was only about 700 reduction in the index on the total, which was equal to about one-twelfth, and of that 700, over 200 was contributed by one article, steel; since the high level at which its index stood at the later period was due to the change in industrial habits which Belgium shared with the rest of the world rather than to any change in the industrial welfare of the country. He thought it was a little unfortunate that in reflecting the progress of iron and steel industries the author had not contented himself with the iron index, inasmuch as the steel index was open to his own criticism and dominated the second group of seven index numbers in which it occurred in an extraordinary way, overwhelming the other six and thus perverting the result. Another point arose with regard to the negative index numbers, where the author had followed Benini. With regard to these, he had used the word "inversion"; and it occurred to one that a real inversion, not a mere reflection of the number in a glass at the normal level, might have avoided the particular difficulty to which he referred in handling negative indices showing increases of over 100 per cent.; and might, moreover, have given an index which would have commended itself to the critic at least as thoroughly as the index he had actually constructed. The exact extent of the influence to be allowed for these unfavourable index numbers was of course a matter of opinion, and other modes by which it could be given effect to would suggest themselves to anyone with a little acquaintance with elementary mathematics. Perhaps one of the greatest services which the presentation of the Paper would render to the Society was in calling attention to the certain possibilities in handling statistics, and opening up a field for examination and criticism of those statistics. Looking down the four groups of numbers on page 274, he noticed that group 1 showed a comparatively slight degree of fluctuation. It never got far above and never far below the starting level; it was composed of a number of indices which by their nature could not show much fluctuation. The birth rate fluctuated by a certain amount, but as a rule did not show an extraordinary rate of decrease. If it showed a steady decline, it was a comparatively modest one. Again, the death rates showed a steady decline, but within modest limits. When they came to the other indices, like industrial production, which were included in the second group, something like a chronic advance was recorded. The figure advanced from 100 up to over 200 towards the end. Similarly, with groups 3 and 4. It was worthy of a little consideration what was the best method of combining a series of index numbers having such different characteristics—whether the simple addition of them and a subsequent division by the total number sufficiently allowed for the indications contained in, say, group 1, which showed merely a fluctuation about a fairly constant level, and those contained in groups 2, 3 and 4, which showed a fluctuation about a steadily rising level. That was a problem upon which he would not dwell. They had become fairly familiar in England with the use of certain index numbers relating to various classes of phenomena and with studying them beside each other, but he was able to recall only one case, and that was one which he would not cite in detail, in which anybody had propounded a group of index numbers resulting from the addition of indices of such different character to one another. They had been rather content to take individual indices, consider them by themselves and endeavour to draw the lessons they seemed to carry as the aggregate impression given by examining the several groups. That was a point to which attention might fairly be given by the Society—as to whether the construction of an aggregate index number was entirely justified, and whether it would give satisfactory results. He did not know that the tracing of the curve was itself a demonstration of that, although much of the curve was made up from indications, from production, from traffic, and from financial transactions, the expansion of which distinctly reflected the expansion of industrial activity and general welfare. The trace of the curve probably did reflect the fact that Belgium had been making a fairly steady advance in company with neighbouring nations, an advance at which they would all rejoice. Still, he was not quite convinced that the combination of the last three groups with the first group was really very much of a gain, or whether the presentation of the groups by themselves for comparison and criticism was not a more important contribution to their knowledge of the position of Belgium than the reduction of the whole four to a single index number. In expressing this criticism he did not feel that he was in the least degree departing from the spirit of the motion, which he had very much pleasure in bringing forward, that they should in the most hearty manner pass a vote of thanks to M. Julin.

Mr. MALLET, Registrar-General, in seconding the vote of thanks, said he must confine himself to a very few general remarks, since he was also quite unfamiliar with Belgian statistics. The author's effort was a very ambitious one, but he seemed to have succeeded in demonstrating in a very compact form what the material progress of Belgium had been and in measuring that progress with a greater degree of apparent exactitude than had been done in any former investigation of the kind. The fact that the author's figures, as shown by the curve, corresponded with the well-known periods of economic crisis, and "reflected their effects," was a most important testimony to their general accuracy and value. The general index number which took account of the dominating factors relating to the moral progress and other matters must be open to any amount of argument; but, once established, there seemed to be no reason why it might not form a useful method of measurement with future years if it were kept up on the same lines; and it would be a still more important step if the same method could be applied to other countries, so that an international comparison of progress might be instituted. He feared that such an ideal must remain unattainable; because, even if the factors were the same, and the statistics were on the same lines, there would be always a question of the relative weight to be given to the different indices, positive and negative. It was certainly true, as Mr. Bowley remarked in his study of National Progress, in 1904, that "our statistics and these of most other nations are insufficient to bear the strain of any general enquiry"; but the author had shown what good use could be made of statistics in his own country, although he complained of the decentralisation existing in different Government departments and of their deficiencies with regard to exactitude and scientific treatment in the field they covered. His statements on this point read like an echo of much of what their former President, Sir Charles Dilke, and others had been for many years preaching both outside and inside the Society with singularly little effect. In that connection he wished to mention the article by their late President, Sir A. Baines, in the current number of the *Financial Review of Reviews*: and he hoped his lively pages would have more effect in stimulating improvement in this matter. It was, however, consoling to find that other countries suffered from the same defects as we did, and perhaps to an even greater extent. He believed there was a central Commission of Statistics in Belgium, but the author did not mention it, perhaps because its operations were not very effective. In one respect Belgium was worse off than ourselves in considering national progress—namely, in their Revenue Statistics. That was really the most important set of statistics which could be obtained for measuring national progress; and, according to the author, Belgian statistics were very defective on that point. An income tax might have its drawbacks, but statistically it was most advantageous. An income tax, in our sense, did not exist in Belgium. The author might be congratulated on the wonderful figures of progress he had put forward at the end of his Paper. That progress was not due to a Tariff, nor perhaps to the absence of one, but to various other considerations, to the geographical situation of Belgium between two of the greatest Continental nations, to the industry and thrift of the population and to some other agencies, such as the Société Générale which, he was told, had an effect in financing enterprises similar to that of the German banking system. But, whatever the explanation, every Englishman would rejoice at the result, and be grateful to M. Julin for having selected the Royal Statistical Society for the first appearance of this interesting and important study.

Mr. YULE said he was extremely interested in the Paper, which opened up a very wide problem indeed and raised philosophic questions of considerable difficulty, with some of which Mr. Flux had already dealt. The author began by defining his problem as he understood it as essentially that of measuring changes in wealth; but he also took into account certain "demographic and moral data," such as the number of illegitimate births, of suicides, and so on. To a certain minor extent, these factors were affected by the economic cycle; but that did not appear to be the reason for their introduction. What was the meaning of an index number that combined in this way measures of economic change and also measures of moral change? It seemed to him rather difficult to understand. Reducing the case to its simplest terms, it became obviously very difficult. Taking only two indices, if the exports of a country had increased by 50 per cent., and the illegitimate births had also increased by 50 per cent., reversing the record index and taking the arithmetical mean, one concluded that the country had made no progress, because the increase in the illegitimate births balanced the increase in wealth owing to exports. But in what sense could it be said to balance? That seemed to him a matter which the author might have further discussed with advantage, although it would have made an already fairly lengthy paper somewhat longer; but it was a fundamental point if one was going to combine statistics of such a different nature as those of illegitimate births or the legitimation of natural children with data as to exports and imports, the production of coal, and so forth. As regards the method of inverting the index number for unfavourable factors, he agreed with Mr. Flux that it would seem better to have taken the reciprocals of unfavourable index numbers. As a fact, that would alter by several points even some of the index numbers which did not differ very greatly from 100. For example, on page 259, the index number for bankruptcies, 83·4, was altered by the author's method to 116·6; but if, instead, one took the reciprocal instead of 116·6 one got 120. If one had several of these negative index numbers which were inverted in this way, and one increased them all by three or four points, it might make a perceptible difference in the aggregate. Moreover, that process of using the reciprocal would not have added much to the arithmetical work, because there were tables (Barlow's Tables) from which one could read off the reciprocal of any number up to four figures, which would be quite sufficient for the purpose, without doing any arithmetic at all. The only paper he could call to mind which had attempted to deal in at all the same sort of way with the data for England was the note by Mr. Bowley in the *Economic Journal* to which Mr. Mallet had already referred, but Mr. Bowley did not mingle demographic and moral factors with data as to income and capital. He took into account statistics of wages and income, corrected the statistics of wages for unemployment and corrected the whole results for changes in prices. M. Julin said at the end of the Paper that we should not, above all, confuse an increase in economic activities of all kinds with the increase in the general well-being of a nation. That depended on intellectual and moral elements which could not be weighed statistically. But, in including the data as to illegitimate births and so forth, was not the author attempting to measure in a way these very moral elements? There were two other papers, besides Mr. Bowley's, which dealt with progress in England, the only two which he could call to mind, namely, the interesting paper by Mr. Wood on working class progress in the *Journal* for 1899, and Sir Inglis Palgrave's address to the Institute of Bankers, in 1904, on the economic condition of the country. In both those papers, however, no combination of index numbers was attempted; it was left to the reader to combine in one mental picture the data presented. The problem, whether one could legitimately combine in one index number many of these factors, and if so how could they best be combined, was certainly a most interesting problem, and they were greatly indebted to the author for the manner in which he had placed it before them, illustrated in detail for the case of Belgium. He also felt they were indebted to M. Julin for his detailed examination of the statistics of Belgium, pointing out the weak points and explaining why he was not able to deal with some of them. Such an examination would be most useful to a reader in this country.

The PRESIDENT said he desired to associate himself most cordially with the vote of thanks. They were all indebted to M. Julin for a most interesting Paper, the result of great industry and research. The Paper had passed through the ordeal of discussion by previous speakers very successfully. The various crises as enumerated by M. Julin which occurred during the period under consideration seemed to show that the lesson the author wished to impress on them from the figures was accurate and could be fairly relied upon. The only remark he would make, in accordance with preceding speakers, was that he thought the author, in his desire to give a full and comprehensive view of the progress made by Belgium, had brought in figures which seemed to him hardly to come under the head of economic progress. No doubt it was well that we should know that in other respects than in that of the mere production and increase of wealth Belgium had made progress; but some of the statistics did not seem to him to mean the same thing as those vital or demographic statistics with which they were associated, and he thought the effect of a most excellent paper had been a little marred by linking together figures which although statistically they might be in the same index had little to do one with another. On page 287 they had the phenomena embodied in the index of the relative number of marriages to the number of couples who had reached the marriageable age, and the quantity of coal extracted. On page 291, there were the percentages of recognition of natural children by marriage 126·8; and then, the value of the production of quarries 139·8. It seemed to him that if the two classes of statistics were brought in under the head of economics to show the progress of the nation they ought to be kept in separate indices. Of course there were certain figures which might legitimately come in, for instance bankruptcies; the cause of bankruptcy might be moral, but the main contributing cause of bankruptcy was the economic condition of the country prevailing at the time. Those were the only criticisms he wished to make. He thought the Paper an excellent one. The author's analysis of what strikes taught them was very just. There was always an interval between a rise in prices and a rise in wages. Strikes, as the author pointed out, came under two classes, namely strikes for an increase of wages, and against a reduction. He believed it would be generally found that a strike for an increase of wage came from the men a little late; whereas the demand of the master for a reduction of wage also came a little late: they did not synchronise with either the highest or the lowest price, but were, as a rule, a little in advance of or behind a rise in price of the article in the production of which they worked. Therefore he thought the consideration of strikes was perfectly justifiable, and if analysed in the manner suggested would be indicative of either the economic progress or the retrogression of a country. In putting the vote of thanks he regretted that M. Julin was not present so as to be able to receive personally these congratulations upon his Paper.

The following reply to the discussion has been received from M. Julin:—

M. JULIN a vivement regretté que des circonstances indépendantes de sa volonté le missent dans l'impossibilité de présenter en personne son Mémoire à la Société royale de Statistique de Londres. Il tient à assurer de sa gratitude les membres de la Société qui ont prêté quelque intérêt à son travail, et il ne remercie pas moins vivement ceux qui ont bien voulu lui présenter des critiques, car dans une matière aussi neuve et qui touche à des questions aussi élevées et aussi nombreuses, c'est rendre à l'auteur un vrai service que de lui indiquer les parties de son œuvre qui pourraient être améliorées.

L'auteur pense que la remarque la plus importante et la plus générale qui ait été faite à propos de son Mémoire est celle qui vise la réunion, dans un même Index-Number, de phénomènes moraux et économiques. La même opinion à cet égard a été exprimée par M. Flux et par M. Yule, quoiqu'il y ait des nuances dans leur appréciation, M. Yule étant plus rapproché de la conception de l'auteur que M. Flux. L'appréciation de cet honorable membre parait influencée par la méthode des Index-Numbers, telle qu'elle est appliquée dans la statistique des prix, et dans laquelle chaque indice est à peu près de la même nature que les autres. M. Flux se demande s'il n'eût pas été préférable d'envisager successivement des groupes d'Index homogènes plutôt que de construire un index final (aggregate). L'auteur pense avoir donné, partiellement tout au moins, satisfaction à M. Flux en calculant l'Index propre à chacun des quatre groupes qu'il a successivement envisagés; il croit que l'Index final (aggregate) s'impose néanmoins dans une recherche

de la nature de celle-ci, si au moins on adopte comme point de départ les vues de Neumann-Spallart, de Wagner, de Pantaleoni et d'autres qu'il a rappelées au début de son travail. Les progrès économiques d'une nation ne peuvent s'apprécier correctement si l'on se borne à envisager seulement un ordre de phénomènes, soit par exemple les échanges seuls, ou les revenus de l'État seuls, ou encore les quelques rares données que l'on possède sur la production, matière excessivement mal connue dans tous les pays du monde. Il peut parfaitement arriver que des progrès se remarquent dans un certain ordre de faits, tandis que des régressions se constatent dans un autre. Comment, dès lors, pourrait-on conclure, si l'on ne fait la balance entre ces deux catégories de faits, chose impossible sans recourir à l'Index final (aggregate). Il y a certes beaucoup de différences entre tous les Indices économiques accumulés, mais ces Indices représentent tous des faits de la vie économique ; or celle-ci est extrêmement complexe, présente des aspects essentiellement différents et il n'est pas étonnant que pour traduire ses manifestations diverses on doive recourir à des indices de nature fort différente. On est habitué à consulter les "index-numbers" des prix et à se figurer, d'après leurs variations, les changements du pouvoir d'achat de l'argent (money) ; mais, là aussi, de nombreuses différences existent entre les articles considérés ; les uns intéressent grandement la vie des citoyens, comme le blé, d'autres n'intéressent qu'une industrie spéciale, d'autres encore ne présentent qu'un intérêt très minime. Cela n'empêche que chacun de nous se réfère aux Index-Numbers pour apprécier un phénomène d'ordre très général, à savoir les variations du pouvoir d'achat de la monnaie, encore que les changements de prix dans le moindre des articles envisagés pèsent tout autant sur le résultat final que les changements qui se remarquent dans les prix d'une denrée de première nécessité, telle que le blé.

Aussi M. Flux n'insiste-t-il pas beaucoup sur cette critique. Il termine son exposé en disant qu'il n'est pas tout à fait convaincu que la réunion de l'Index du premier groupe (phénomènes démographiques et moraux) et ceux des groupes 2, 3 et 4 soit un avantage. Il laisse évidemment entendre par là que l'index totalisateur lui parait d'un emploi légitime pour les groupes 2, 3 et 4, mais non pour l'ensemble, déclaration dont l'auteur prend acte. M. Yule partage le même sentiment, quoique avec plus d'hésitation. Quelle est, demande-t-il, la signification d'un Index-Number qui combine les mesures des changements économiques et les mesures des changements d'ordre moral ? M. Yule n'est pas éloigné de saisir la pensée de l'auteur quand il se demande, quelques lignes plus loin, si M. Julin n'a pas essayé de mesurer, par l'étude des phénomènes démographiques et moraux, des réactions sociales non perceptibles par l'analyse des phénomènes économiques habituellement relevés par la statistique. Ce qui fait hésiter M. Yule, c'est ce que l'auteur a dit à la fin de son travail, à savoir qu'il importait de ne pas confondre les progrès économiques dans toutes sortes de directions avec le sentiment du bien-être. Si M. Yule voit entre ces deux propositions quelque contradiction, c'est que l'auteur n'aura pas sans doute clairement exprimé sa pensée, ce dont il s'excuse. L'auteur a voulu dire qu'à côté des phénomènes relatifs à la production et à la distribution des richesses, il en était d'autres qui concernent la répartition et qu'il fallait soigneusement éviter de confondre ces ordres d'idées essentiellement différents. Un sentiment de malaise peut persister au sein d'une nation où la richesse s'accumule, si cette richesse n'est pas répartie d'après les règles de la justice sociale. Et à côté des faits relevés par la statistique, il en est beaucoup d'autres qui échappent au relevé numérique et qui présentent cependant une grande importance. L'auteur pense qu'on ne peut les négliger; il est d'avis que la richesse matérielle n'est pas toujours l'unique objet à considérer; une nation, selon lui, n'est pas engagée dans une voie favorable si la vie morale ne se maintient pas dans la direction satisfaisante. Les éléments impondérables qui échappent à la statistique se traduisent dans une certaine mesure dans les chiffres relatifs aux phénomènes moraux et démographiques. Ceux-ci agissent comme les *réflexes* et leurs variations présentent une importance incontestable. Depuis 1903, c'est-à-dire, depuis la dernière période de prospérité, la proportion des naissances légitimes marque une forte tendance à la diminution. Croit-on que ce fait regrettable ne soit pas à considérer comme un indice modérateur? Il y a lieu de se réjouir d'autres faits, comme il convient de regretter celui-là. Quand on analyse les statistiques belges, on voit nettement que les chiffres de la natalité décroissent d'une façon inquiétante dans la partie wallonne et industrielle du pays, ainsi que dans les grandes villes: à Bruxelles, la proportion des naissances est de 16 pour 1000 seulement! Sans les campagnes flamandes, le chiffre des naissances deviendrait alarmant. Pour qui connait une situation semblable, il n'est pas possible de ne pas en tenir compte et de ne pas la mettre en balance avec les chiffres qui constatent l'extension du commerce et de la production. De même, les mariages contractés en 1900 étaient au nombre de 57,711; dix ans plus tard, en 1910, malgré l'augmentation de population, ils atteignent le chiffre de 57,126, alors que dans la période antérieure on avait noté un fort mouvement ascendant. Ce fait n'est-il pas déterminé par des causes que la statistique ne relève pas? Ne pourrait-on se demander si le sérieux renchérissement du coût de la vie au cours de ces dernières années n'est pour rien dans cette situation stationnaire? Ne pourrait-on même y voir un indice d'un état moral moins satisfaisant? Quoiqu'il en soit, il parait à l'auteur impossible de ne pas tenir compte de faits de cette nature et de ne pas les interpréter comme des facteurs qui marquent une situation dont il convient, selon lui, de tenir compte dans le bilan final de la nation. Ce sont là des questions philosophiques d'une portée considérable et qui n'ont pas échappé à M. Yule. L'auteur remercie MM. Flux et Yule pour leurs suggestions d'ordre mathématique et il s'efforcera de suivre leurs conseils si, comme il l'espère, il a un jour l'occasion de reviser les résultats de ce premier essai et de les compléter.

En terminant, l'auteur voudrait rencontrer une dernière critique présentée par M. Flux. Cet honorable membre pense que l'augmentation considérable de la production de l'acier est due surtout à la révolution industrielle qui s'est accomplie et qui a eu pour effet de substituer l'acier au fer dans une série d'applications. M. Flux pense que l'auteur aurait mieux fait de se contenter de l'Index du fer et d'abandonner celui de l'acier, d'autant plus que l'extraordinaire avance de cet Index domine celle de tous les autres index et fausse ainsi le résultat final.

L'auteur n'a garde de contester que l'acier a, en effet, remplacé le fer dans une série d'applications industrielles, mais la production du fer n'en a pas été diminuée pour cela ; en 1908, année de crise, elle est encore de 127½ millions, chiffre supérieur à la plupart des années précédentes ; il en résulte que l'avance dans la production de l'acier constitue bien un bénéfice net et peut être considérée comme un indice du progrès économique. L'importance de la production de l'acier comme indice économique tient encore à ceci que, non seulement elle éclaire la situation de la métallurgie belge, mais aussi qu'elle permet d'apprécier indirectement les conditions de l'industrie de la construction mécanique. Il est regrettable qu'on ne possède pas de relevé de la production dans l'industrie de la construction mécanique ; on pourra toutefois s'en faire une idée quand on saura que d'après une publication récente du ministère de l'industrie et du travail la production annuelle était évaluée à 357½ millions de francs, dont 142 millions destinés à l'exportation.

L'auteur tient à exprimer à la Société royale de statistique ses remerciements pour l'accueil qui a été réservé à son travail et il adresse l'expression particulière de sa gratitude à MM. Yule et Flux pour leurs judicieuses observations.

The following candidates were elected Fellows of the Society :—

- Thomas Butler.
- Alexander Dunbar.
- Sir Ernest F. G. Hatch, Bart.
- James Pepper.
- The Right Hon. Sir Edgar Speyer, Bart.

OBITUARY.

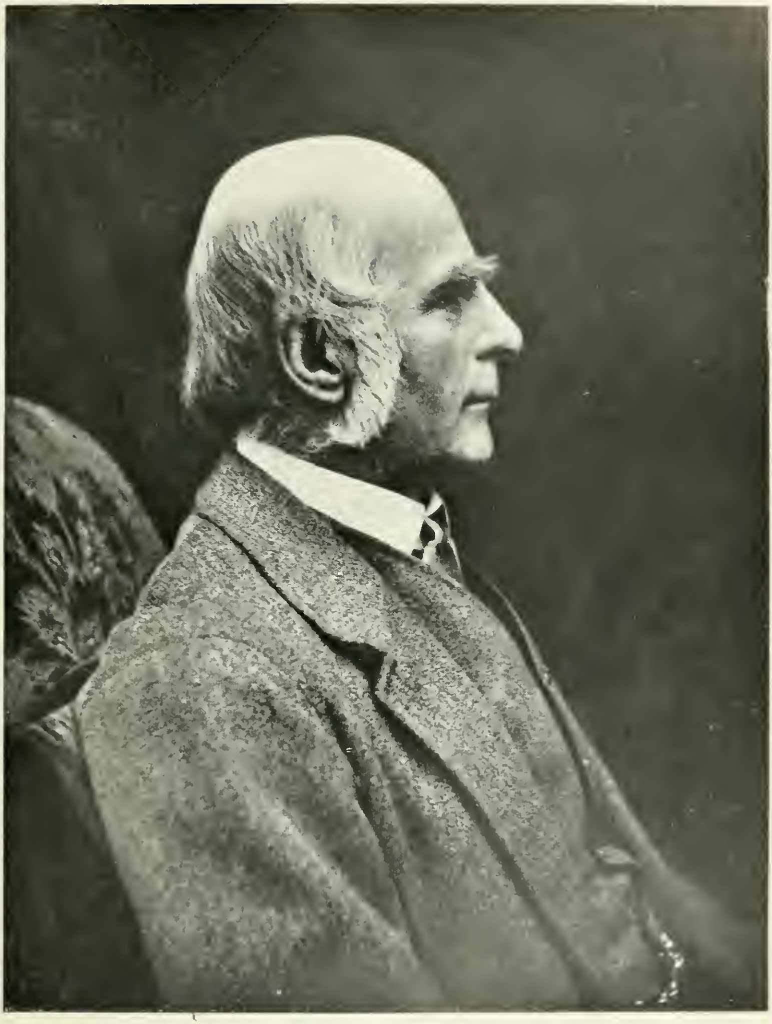
Sir Francis Galton, D.C.L., D.Sc., F.R.S.

SIR FRANCIS GALTON, who passed away on January 17 last, was born at Duddeston, in Warwickshire, on February 16, 1822. His father was a Birmingham banker who married a daughter of Erasmus Darwin, and Galton was therefore, on his mother's side, a cousin of Charles Darwin. He was educated at King Edward VI's School, Birmingham, entering the Birmingham General Hospital in 1838, and completing his medical education at King's College, London. In 1840 he entered Trinity College, Cambridge, and in 1843 he took a poll degree. He married, in 1853, a daughter of Dr. G. Butler, Dean of Peterborough, and was thus the brother-in-law of the Master of Trinity.

Two years after leaving Cambridge Galton undertook a journey to the Sudan, at that time unexplored, and this was followed in 1850 by an expedition, extending over two years, to Damaraland, Ovampoland, and Namaqualand. The fruit of this expedition was the publication in 1863 of his "Narrative of an explorer in tropical South "Africa." This received immediate recognition; Galton was awarded the Founder's gold medal of the Royal Geographical Society, and was elected a member of its council. In 1885 he published "The art "of travel; or shifts and contrivances available in wild countries."

In 1857 he became honorary secretary of the Royal Geographical Society, a position which he retained until 1863, when he became general secretary of the British Association. In this capacity he served the British Association for about five years. But he was, in addition, president of the geographical section in 1862 and 1872, president of the anthropological subsection of biology in 1877, and president of the section of anthropology in 1885. On the death of Admiral Fitzroy he was named a member of the Board of Trade committee appointed to consider the reorganisation of the Meteorological Office, and for nearly forty years he was associated with the Meteorological Committee, created in 1868 in accordance with its recommendations, and its successor, the Meteorological Council. He was also for many years a member, and for some years chairman, of the managing committee of Kew Observatory.

From 1885 to 1888 he was president of the Anthropological Institute, and in 1908 the Linnean Society awarded him the Darwin-Wallace celebration medal. In 1886 the Royal Society, of which he had been elected a Fellow in 1860, conferred on him a Royal medal, in recognition of his statistical inquiries into biological phenomena. This distinction was followed by the award of the Darwin medal in 1902 and the Copley medal in 1910. In 1894 he



Sincerely yours
Francis Galton

received the degree of Honorary D.C.L. of Oxford University, and in 1895 his own University of Cambridge conferred on him the degree of Hon. D.Sc., while he was also made an honorary Fellow of Trinity. In 1909 he was knighted.

Sir Francis Galton's connection with this Society dates from 1860, when, on the proposal of Colonel E. H. Sykes, seconded by Mr. James Heywood, he was elected a Fellow. He served on the Council from 1869 to 1879, and was chosen to serve as a Vice-President in 1875. He contributed to the JOURNAL on several occasions, the first contribution being "The relative supplies from "town and country families to the population of future generations." (*Journal of the Statistical Society*, vol. xxxvi, 1873.) His other contributions were: "A common error in statistics" (*Statistical Society's Jubilee Volume*, 1885), and "Application of the method of percentiles "to Mr. Yule's data on the distribution of pauperism" (*Journal of the Royal Statistical Society*, vol. lix, 1896). In 1886 he was elected an honorary member of the International Statistical Institute.

This brief outline of his life will give some, but only a faint, idea of the variety of Galton's scientific activities; it is hardly possible for a worker in any one branch of science to realise how fundamentally the freshness of his outlook, the entire novelty of his methods, have affected the scope and character of research in many branches of knowledge. In meteorology, he was largely responsible for the introduction of graphical methods of mapping the weather; he took a considerable part in the early construction of the daily weather charts appearing in *The Times*, and he was the originator of that now familiar term an *anticyclone*. His various memoirs on points of psychology, dating from the seventies, and partially summarised in the "Inquiries into human faculty and its development" (1883) are of fundamental originality and importance. In biology, he was the originator of the use of statistical methods. In sociology, the adoption of the biological standpoint is largely the result of his researches; he was the inventor of the term eugenics and the science of eugenics, and the founder of the Eugenics Laboratory. As an incidental result of his statistical researches in biology, he was the parent of modern statistical methods.

In his statistical work Galton may fairly be said to have inherited the mantle of Quetelet, though his interest was first seriously drawn to the normal law of error owing to its use by William Spottiswoode in a geographical memoir. It seems clear, however, from the references in "Hereditary Genius" (1869), that it is to Quetelet's "Letters" in Downes' translation he is indebted for his knowledge of the properties of the curve, and like Quetelet, he always regards the normal curve as derived from the binomial series.

His first contribution to the methods of statistics, foreshadowed in "Hereditary Genius," was the method of grades or percentiles ("Statistics by intercomparison, with remarks on the law of frequency "of error." *Phil. Mag.*, 4th series, vol. xlix, 1875). It deserves perhaps to be emphasised that in this memoir Galton lays stress principally, indeed almost wholly, on the application of the method to unmeasured characters. His object is to describe a method "which has the merit of being applicable to a multitude of objects "lying outside the present limits of statistical inquiry"; the objects need only to be ranked in order as regards the character considered; the middlemost (median) then indicates the average, those one-quarter distant from either end (quartiles) the divergency of the series. These particular objects need not, perhaps cannot, be measured as regards the character concerned, but if they can be pictured or described we have a summary picture or description of the series. The method is, of course, freely used in "Natural "Inheritance" (1889) and the memoirs that preceded it, and Galton's continued interest in it is evidenced by papers published from time to time during the remainder of his life. Reference has already been made to one contribution in this JOURNAL, in 1896; mention may also be made of notes "on the median estimate," in the B.A. Report for 1899, on a geometrical method of determining the median of a normal distribution from two centiles (*Nature*, 1900), on the application of the median in voting, *e.g.*, for damages to be awarded by a jury or in guessing (*Nature*, 1907), and of the explanatory introduction to a table of Grades and Deviates of the Normal Curve, calculated by Mr. Sheppard, in vol. v of *Biometrika* (1907). A remarkable memoir "On the most suitable proportion "between the values of first and second prizes," published in *Biometrika*, vol. i, 1902, is also related to the same train of ideas. In more general terms the problem is this: if the objects or individuals with which we are concerned are ranked in order, as for the determination of percentiles, what is the average difference between the nth and the $(n + 1)$th ? The originality is characteristic: the whole problem is new to statistical theory—and the author of the memoir was aged 80.

The method of percentiles, while in many respects novel, may be regarded rather as a new application of a much older idea—the idea at the root of the determination of the median and of the "probable error." By his invention of the method of correlation Galton opened an entirely fresh field of work. Certain memoirs by earlier writers deal with problems which present some mathematical similarity to those with which he was concerned—the distribution of shots on a target or of stars in space—but to no one had it occurred to apply such methods to the serious study of statistical relations, nor to employ a single coefficient as a measure of the closeness of the relation between two varying quantities. Just as the method of percentiles arose from Galton's work on the inheritance of genius, the method of correlation arose from his studies on the inheritance of stature and in anthropometry; the fundamental memoirs are the Address to Section H (Anthropology) of the British Association (1885), "Regression towards mediocrity in hereditary stature" (Presidential Address) (*Journ. Anthrop. Inst.*, vol. xv, 1886, p. 246), "Family likeness in stature" (*Proc. Roy. Soc.*, vol. xl, 1886, p. 42), and "Correlations and their measurement" (*ibid.* vol. xlv, 1888, p. 135). The first three of these memoirs form a single group, dealing with the same data, the third being provided with an appendix by Mr. J. Hamilton Dickson on the theoretical expression for the normal correlation surface; in the fourth the theory is dealt with from a somewhat more general point of view, the correlation being considered between two different measurements on the same individual, instead of between the same measures on parent and offspring, and coefficients of correlation are given for stature with cubit (0·8), head-length (0·35), middle finger (0·7) and height of knee (0·9); for height of knee and cubit (0·8); for cubit and middle finger (0·85), and for head-length and breadth (0·45). The concluding passage of the memoir is worth citing for its historical interest:—"The prominent "characteristics of any two correlated variables, so far at least as "I have as yet tested them, are four in number. It is supposed "that their respective measures have been first transmuted into "others of which the unit is in each case equal to the probable "error of a single measure in its own series. Let y = the deviation "of the subject, whichever of the two variables may be taken in "that capacity; and let x_1, x_2, x_3, &c., be the corresponding "deviations of the relative, and let the mean of these be X. Then "we find (1) that $y = r\text{X}$ for all values of y, (2) that r is the same "whichever of the two variables is taken for the subject, (3) that r "is always less than 1, (4) that r measures the closeness of the "co-relation." Galton determined r by a simple graphic method, which has since been replaced by the product-sum formula due to Professor Pearson and suggested by a memoir of Bravais; but to Galton is due the idea of such a coefficient (termed "Galton's "function" by Professor Weldon in his earlier papers); he introduced the symbol by which it is now generally represented and determined all its principal properties—the values of the regressions (r is the initial letter of regression) and the standard deviations of arrays.

Mention was made above of the theoretical paper by

Mr. Hamilton Dickson on the form of the normal correlation surface; in his "Memories of my Life," Galton tells us how he came to ask for Dickson's assistance. He had formed the correlation table for stature of parent and child, and had determined its principal properties, but could not see his way to express the results of the complete table in a single formula. Poring over the diagram in his notebook while waiting at a roadside station near Ramsgate for a train, it struck him at length that the lines of equal frequency ran in concentric ellipses, and more careful drawing corroborated the first impression —a skilled guess of a most remarkable kind when the roughness of the data is considered. "All the formulæ of conic sections having "long since gone out of my head, I went on my return to London "to the Royal Institution to read them up. Professor, now "Sir James, Dewar came in, and probably noticing signs of despair "in my face, asked me what I was about; then said, 'Why do you "'bother over this? My brother-in-law, J. Hamilton Dickson, of "'Peterhouse, loves problems and wants new ones. Send it to "'him.'" Galton did so, and all his empirical conclusions were fully confirmed. The assistance sought in this case, when Galton's abilities did not suffice to solve the mathematics of his problem, is paralleled in other instances. Dr., now Sir, Donald Macalister contributed a mathematical sequel to his paper on "The geometric "mean in vital and social statistics" (*Proc. Roy. Soc.*, vol. xxix, 1879, p. 365), and the Rev. H. W. Watson was associated with him in an earlier memoir on the probability of the extinction of families (*Journal Anthrop. Inst.*, 1875).

Of recent years Galton's main interest lay in the propagation of the ideas of eugenics, but it must not be forgotten that this was a subject which had always lain near his heart since the days when he had been working at "Hereditary Genius" forty years before; the word itself first occurs in "Human Faculty" (1883, p. 24). Many passages of "Hereditary Genius" reflect the eugenic idea; the gist of the matter is given at once on p. 1. "I propose to show in this book that a "man's natural abilities are derived by inheritance, under exactly "the same limitations as are the form and physical features of the "whole organic world. Consequently, as it is easy, notwithstanding "these limitations, to obtain by careful selection a permanent breed "of dogs or horses gifted with peculiar powers of running, or of "doing anything else, so it would be quite practicable to produce a "highly gifted race of men by judicious marriages during several "consecutive generations." The views are emphasised again towards the end of the book, and are essentially the same as those that were advanced in the magazine article that was written some four years before the publication of "Hereditary Genius." His more recent views on the subject will be found illustrated by a series of papers read before the Sociological Society, republished in volume form in 1905, and by the Herbert Spencer lecture of 1907. In 1904 Galton founded a Research Fellowship in National Eugenics under the University of London, providing sufficient endowment for the tenure of the Fellowship for three years, for the publication of memoirs, and for office expenses. Mr. Edgar Schuster was appointed to the Fellowship, and on his resignation, in 1907, was succeeded by the present holder, Dr. David Heron. At the same time the office was reorganised on a more permanent footing, under the title of the Francis Galton Eugenic Laboratory, with a Scholar and Computer in addition to the Fellow, under the general direction of Professor Pearson and Sir Francis Galton himself.

It has only been possible to mention incidentally Galton's direct contributions to psychology in his "Inquiries into human faculty and "its development" (1883), and the related memoirs on whistles for determining the upper limits of audible sound, on generic images, on visualised numerals, on apparatus for testing the delicacy of the muscular senses and allied matters. His statistical methods are an indirect contribution of equal or greater importance. As regards his work on finger prints also, we can only cite the titles of his contributions—"Patterns in thumb and finger marks" and "Methods of indexing finger marks" (*Proc. Roy. Soc.*, 1891), "Finger prints" and "Blurred finger prints" (1893), and "Finger "print directory" (1895). No account of his work would, however, be complete without some reference to his remarkable mechanical ability. The first scientific paper which he published was a most ingenious scheme for a printing telegraph, and we have in subsequent years designs for a hand heliostat, for anthropometric instruments, for apparatus for measuring the rate of movement of various limbs, for apparatus for reducing horizontal and vertical scales of diagrams in different proportions, and for computing vapour tension. His mechanism for giving the average statures of children in terms of the statures of the parents, and his apparatus for reproducing the normal curve by allowing a stream of shot to trickle through a forest of nails will be familiar to all readers of "Natural "Inheritance." Readers who wish to supplement this all too incomplete account of his work must be referred to the bibliography at the end of his "Memories of my Life," and to his works themselves.

Of Galton's personal character it is impossible to speak too highly. His papers, and above all his "Memories," are in themselves a revelation of the simplicity and innocence of his spirit, and his innate goodness and modesty. His intense and childlike delight in the mathematical verification of an empirical result, in the successful overcoming of a difficulty, in some unexpected appreciation of his work, appears continually. It is characteristic that he was never engaged in controversy. No younger man who came into personal contact with him is likely to forget his cheery welcome, his friendly and utterly unassuming discussion—as between equals—of any points that might arise. He was one of those rare characters that inspire at once a respect that is not unmingled with a strong affection.

Sir Francis Galton's own bent for statistics seems to have been to some extent inherited from his ancestors. His paternal grandfather, Samuel John Galton (1753-1832), he speaks of as "a scientific "and statistical man of business; he had a decidedly statistical bent, "loving to arrange all kinds of data in parallel lines of corresponding "lengths, and frequently using colour for distinction." S. J. Galton was a contemporary of Playfair (1759-1823), and the use of graphic methods may perhaps have been suggested by his works. Francis Galton's father, Samuel Tertius Galton, was also "eminently statistical "by disposition," and published a chart, with explanatory text, on currency questions ("A chart exhibiting the relation between the "amount of Bank of England notes in circulation, the rate of foreign "exchanges, and the prices of gold and silver bullion and of wheat, "with explanatory observations." London, 1813.)

The Right Hon. Sir C. W. Dilke, Bart., M.P.

Sir Charles Dilke, whose death in his 68th year occurred on January 26th, had been a Fellow of the Royal Statistical Society since 1866, when he was elected on the nomination of Dr. Newmarch. He served as a member of the Council in 1869-71, and was President in 1907-09. He contributed papers to the Society's Proceedings in 1874 on "Local government among different nations" (Journal, vol. xxxvii), in 1876 on "The municipal government of Paris" (Journal, vol. xxxix), in 1891 on "Statistics of defence expendi-"ture of the chief military and naval powers" (Journal, vol. lxiv), and in 1900 on "The defence expenditure of the Empire" (Journal, vol. lxiii). For his presidential address, delivered in November, 1907, he took the subject of "Official statistics," and throughout his term of office he recurred frequently to the same subject, to which when chairman of the Select Committee on the Income Tax, in 1906, his attention seems to have been specially directed. His denunciation of the imperfections of certain statistical returns was vigorous, and he averred more than once that he hoped to signalise his presidency of the Society by promoting an improvement in the system by which official statistics are now compiled and issued. He induced the Select Committee on Publications to hear evidence on behalf of the Society on this subject, but the Committee did not think themselves entitled, by the terms of their reference, seriously to consider the subject. At the suggestion of Sir Charles the Council of the Society agreed to enlarge the constitution and scope of the Census Committee, so as to include the consideration of official statistics generally, and that Committee, under the chairmanship of Sir Athelstane Baines, is now engaged upon the heavy task involved in this extension of their duties.

While Sir Charles Dilke would have declined the title of statistician, and indeed frequently referred to himself as a "mere "user" of statistics, he possessed in a high degree what may be termed the statistical instinct. His genius for marshalling facts in orderly sequence, his passion for precision of statement even in minute detail, his accurate recollection of figures, as indeed of everything which he stored in the chamber of his encyclopædic memory, are all primary attributes of the ideal statistician, though in his case the wide range and magnitude of the subjects in which he was interested led far beyond the field of statistical investigation. Reference may be made to the important part played by Dilke in the French treaty negotiations of 1881-82. As Under-Secretary at the Foreign Office he was appointed Chairman of the Royal Commission to negotiate a new commercial treaty with France—a task of considerable difficulty, as the new French customs tariff involved the change from *ad valorem* to specific duties on a large number of articles in which this country was specially interested. The negotiations were further complicated by the fact that other foreign nations were negotiating tariff treaties with France at the same time. The negotiations extended over nearly a year, and during that time it was necessary to keep in close touch with the representatives of all the chief British industries, and to make constant use of complicated calculations, such as those of thread and weight categories in the textile industries. In this Sir Charles Dilke was eminently successful. The negotiations of other Foreign Powers with France were so influenced that in the result, although Great Britain signed no tariff treaty, the conventional rates agreed to between France and such countries as Belgium and Switzerland were more favourable to British trade than might have been hoped. Soon after the conclusion of these negotiations, Dilke was promoted to the Presidency of the Local Government Board with a seat in the Cabinet.

This, however, is not the place to dwell upon Sir Charles Dilke as Statesman, man of letters, connoisseur, traveller, or *raconteur*—in each of which capacities he was distinguished—but his services to the Society and his zeal for statistical progress call for this brief tribute to the memory of one who contributed notably to the proceedings of the Society, and filled with high distinction and with characteristic energy and assiduity the position of its President.

MISCELLANEA.

The Principal Averages and the Laws of Error which lead to them.

By J. M. Keynes.

§1. The following is a common type of statistical problem. We are given a series of measurements, or observations, or estimates of the true value of a given quantity; and we wish to determine what function of these measurements will yield us the *most probable* value of the quantity, on the basis of this evidence. The problem is not determinate unless we have some good ground for making an assumption as to how likely we are in each case to make errors of given magnitudes. But such an assumption, with or without justification, is frequently made.

The functions of the original measurements which we commonly employ, in order to yield us approximations to the most probable value of the quantity measured, are the various kinds of means or averages—the arithmetic average, for example, or the median. The relation, which we assume, between errors of different magnitudes, and the probabilities that we have made errors of those magnitudes, is called a *law of error*. Corresponding to each law of error which we might assume, there is some function of the measurements which represents the most probable value of the quantity. The object of the following investigation is to discover what laws of error, if we assume them, correspond to each of the simple types of average, and to discover this by means of a systematic method. It is also an object to make the preliminary proof very precise, in order to bring out with clearness exactly what assumptions are involved in it.

§2. It is necessary for this purpose to introduce the fundamental symbol of probability.[*] The probability of any proposition varies according to the evidence upon which we base it.[†] In this case the probability, that the quantity has a certain value, depends upon the magnitudes of the measurements which we have made, since these measurements constitute our evidence. Let H represent the evidence, and A the conclusion into whose probability we are inquiring relatively to this evidence. Then the probability of A, when H is the evidence, may be represented by the symbol A/H.

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[*] I hope to publish shortly a treatise on Probability, in which the properties and the use of this symbol, of which the following is an example, are fully developed. But the following example, although it can be expounded most precisely by means of this symbol, does not depend for its validity upon controversial assumptions. The only formulæ which are employed, namely, the principles of inverse probability and of the multiplication of independent probabilities, are generally accepted, although different interpretations can be given to the philosophical significance of the probabilities which they enable us to manipulate. The reader is not to suppose that an unfamiliar symbolism cloaks, in this case, any unusual assumption.

[†] Some might prefer to put this as follows:—"The probability of any event varies according to the series to which we refer it, and we select this series by reference to such relevant evidence as we happen to possess."

§3. Let us assume that the real value of the quantity is either $a_1, \ . \ . \ . \ a_r \ . \ . \ . \ $ or a_n, and let A_r represent the conclusion that the value is, in fact, a_r. Further let X_r represent the evidence that a measurement has been made of magnitude x_r.

If a measurement x_p has been made, what is the probability that the real value is a_s? The application of the ordinary rule of inverse probability yields the following result:—

$$A_s/X_pH = \frac{X_p/A_sH. \quad A_s/H}{\sum\limits_{r=1}^{r=n} X_p/A_rH. \quad A_r/H},$$

(the number of possible values of the quantity being n), where H stands for any other relevant evidence which we may have, in addition to the fact that a measurement x_p has been made. In the above A_s/X_pH represents the probability that the true value is a_s, given the measurement x_p; X_p/A_sH represents the probability of our making the measurement x_p, when it is given that the true value is a_s; and A_s/H represents the *a priori* probability, before any measurement has been made, of the true value's being a_s. The terms in the denominator correspond to the other possible values of the quantity.

Next, let us suppose that a number of measurements $x_1, \ . \ . \ . \ x_m$, have been made; what is now the probability that the real value is a_s? We require the value of $A_s/X_1X_2 \ . \ . \ . \ X_mH$. As before,

$$A_s/X_1X_2 \ . \ . \ . \ X_mH = \frac{X_1 \ . \ . \ . \ . \ X_m/A_sH. \quad A_s/H}{\sum\limits_{r=1}^{r=n} X_1 \ . \ . \ . \ X_m/A_rH. \quad A_r/H}.$$

§4. At this point we must introduce the simplifying assumption that, if we knew the real value of the quantity, the different measurements of it would be *independent*, in the sense that a knowledge of what errors have actually been made in some of the measurements would not affect in any way our estimate of what errors are likely to be made in the others. We assume, in fact, that $X_r/X_p \ . \ . \ . \ X_sA_rH = X_r/A_rH$. This assumption is exceedingly important. It is tantamount to the assumption that our law of error is unchanged throughout the series of observations in question. The general evidence H, that is to say, which justifies our assumption of the particular law of error which we do assume, is of such a character that a knowledge of the actual errors made in a number of measurements, not more numerous than those in question, are absolutely or approximately irrelevant to the problem as to what form of the law we ought to assume. The law of error which we assume will be based, presumably, on an experience of the relative frequency with which errors of different magnitudes have been made under analogous circumstances in the past. The above assumption will *not* be justified if the additional experience, which a knowledge of the errors in the new measurements would supply, is sufficiently comprehensive, relatively to our former experience, to be capable of modifying our assumption as to the shape of the law of error, or if it suggests that the circumstances, in which the measurements are being carried out, are not so closely analogous as was originally supposed.

§5. With this assumption, *i.e.*, that X_1, &c., are independent of one another relatively to evidence $A_r H$, &c., it follows from the ordinary rule for the multiplication of independent probabilities that

$$X_1 \ldots . X_m/A_s H = \prod_{q=1}^{q=m} X_q/A_s H.$$

$$\text{Hence, } A_s/X_1 X_2 \ldots X_m H = \frac{A_s/H. \prod_{q=1}^{q=m} X_q/A_s H}{\sum_{r=1}^{r=n} \left[\prod_{q=1}^{q=m} X_q/A_r H. \quad A_r/H \right]}.$$

The *most probable* value of the quantity under measurement, given the m measurements x_1 &c.,—which is our *quæsitum*—is therefore that value which makes the above expression a maximum. Since the denominator is the same for all values of a_s, we must find the value which makes the numerator a maximum. Let us assume that $A_1/H = A_2/H = \ldots = A_n/H$. We assume, that is to say, that we have no reason *à priori* (*i.e.*, before any measurements have been made), for thinking any one of the possible values of the quantity more likely than any other. We require, therefore, the value of a_s, which makes the expression $\prod_{q=1}^{q=m} X_q/A_s H$ a maximum. Let us denote this value by x.

§6. We can make no further progress without a further assumption. Let us assume that $X_q/A_s H$—namely, the probability of a measurement x_q assuming the real value to be a_s—is an algebraic function f of x_q and a_s, the same function for all values of x_q and a_s within the limits of the problem.* We assume, that is to say, $X_q/A_s H = f(x_q, a_s)$, and we have to find the value of a_s, namely x, which makes $\prod_{q=1}^{q=m} f(x_q, x)$ a maximum. Equating to zero the differential coefficient of this expression with respect to x, we have $\sum_{q=1}^{q=m} \frac{f'(x_q, x)}{f(x_q, x)} = 0$,† where $f' = \frac{df}{dx}$. This equation may be written for brevity in the form $\Sigma \frac{f'_q}{f_q} = 0$.

If we solve this equation for x, the result gives us the value of the quantity under observation, which is most probable relatively to the measurements we have made.

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* Gauss made, in effect, the more special assumption that $X_q/A_s H$ is a function of e_q only, where e_q is the error and $e_q = a_s - x_q$. We shall find in the sequel that all symmetrical laws of error, such that positive and negative errors of the same absolute magnitude are equally likely, satisfy this condition—the normal law, for example, and the simplest median law. But other laws, such as those which lead to the geometric mean, do not satisfy it.

† Since none of the measurements actually made can be impossible, none of the expressions $f(x_q, x)$ can vanish.

The act of differentiation assumes that the possible values of x are so numerous and so uniformly distributed within the range in question, that we may, without sensible error, regard them as continuous.

§7. This completes the *prolegomena* of the inquiry. We are now in a position to discover what laws of error correspond to given assumptions respecting the algebraic relation between the measurements and the most probable value of the quantity, and *vice versa*. For the law of error determines the form of $f(x_q, x)$. And the form of $f(x_q, x)$ determines the algebraic relation $\Sigma \frac{f'_q}{f_q} = 0$ between the measurements and the most probable value. It may be well to repeat that $f(x_q, x)$ denotes the probability to us that an observer will make a measurement x_q in observing a quantity whose true value we know to be x. A law of error tells us what this probability is for all possible values of x_q and x within the limits of the problem.

(i) If the most probable value of the quantity is equal to the arithmetic mean of the measurements, what law of error does this imply?

$$\Sigma \frac{f'_q}{f_q} = 0 \text{ must be equivalent to } \Sigma(x - x_q) = 0, \text{ since the most probable value } x \text{ must equal } \frac{1}{m}\sum_{q=1}^{q=m} x_q.$$

$$\therefore \frac{f'_q}{f_q} = \phi''(x)(x - x_q) \text{ where } \phi''(x) \text{ is some function which is not zero and is independent of } x_q.$$

Integrating

$$\log f_q = \int \phi''(x)(x - x_q)d_x + \psi(x_q) \quad \text{where } \psi(x_q) \text{ is some function independent of } x.$$

$$= \phi'(x)(x - x_q) - \phi(x) + \psi(x_q).$$

So that $$f_q = e^{\phi'(x)(x - x_q) - \phi(x) + \psi(x_q)}.$$

Any law of error of this type, therefore, leads to the arithmetic mean of the measurements as the most probable value of the quantity measured.

If we put $\phi(x) = -k^2x^2$ and $\psi(x_q) = -k^2x_q^2 + \log A$, we obtain $f_q = Ae^{-k^2(x - x_q)^2}$, the form normally assumed.

$= Ae^{-k^2y_q^2}$, where y_q is the absolute magnitude of the error in the measurement x_q.

This is, clearly, only one amongst a number of possible solutions. But with one additional assumption we can prove that this is the only law of error which leads to the arithmetic mean. Let us assume that negative and positive errors of the same absolute amount are equally likely.

In this case f_q must be of the form $Be^{\theta(x - x_q)^2}$

$$\therefore \phi'(x)(x - x_q) - \phi(x) + \psi(x_q) = \theta(x - x_q)^2$$

Differentiating with respect to x

$$\phi''(x) = 2\frac{d}{d(x-x_q)^2}\theta(x-x_q)^2$$

But $\phi''(x)$ is, by hypothesis, independent of x_q.

$\therefore \quad \frac{d}{d(x-x_q)^2}\theta(x-x_q)^2 = -k^2$ where k is constant; integrating $\theta(x-x_q)^2 = -k^2(x-x_q)^2 + \log \mathrm{C}$ and we have $f_q = \mathrm{A}e^{-k^2(x-x_q)^2}$ (where $\mathrm{A} = \mathrm{BC}$).

(ii) What is the law of error, if the geometric mean of the measurements leads to the most probable value of the quantity? In this case $\Sigma\frac{f'_q}{f_q} = 0$ must be equivalent to $\prod_{q=1}^{q=m} x_q = x^m$, *i.e.*, to

$$\Sigma \log \frac{x_q}{x} = 0.$$

Proceeding as before, we find that the law of error is

$$f_q = \mathrm{A}\ e^{\phi'(x)\log\frac{x_q}{x} + \int\frac{\phi'(x)}{x}d\,x + \psi(x_q)}$$

There is no solution of this which satisfies the condition that negative and positive errors of the same absolute magnitude are equally likely. For we must have

$$\phi'(x)\ \log\frac{x_q}{x} + \int\frac{\phi'(x)}{x}d\,x + \psi(x_q) = \phi(x-x_q)^2$$

$$\text{or } \phi''(x)\log\frac{x_q}{x} = \frac{d}{d\,x}\phi(x-x_q)^2$$

which is impossible.

The simplest law of error, which leads to the geometric mean, seems to be obtained by putting $\phi'(x) = -k\,x$, $\psi(x_q) = 0$. This gives $f_q = \mathrm{A}\left(\frac{x}{x_q}\right)^{kx} e^{-kx}$.

A law of error, which leads to the geometric mean of the observations as the most probable value of the quantity, has been previously discussed by Sir Donald McAlister (*Proceedings of the Royal Society*, Vol. xxix (1879), p. 365). His investigation depends upon the obvious fact that, if the geometric mean of the observations yields the most probable value of the quantity, the arithmetic mean of the logarithms of the observations must yield the most probable value of the logarithm of the quantity. Hence, if we suppose that the logarithms of the observations obey the normal law of error (which leads to their arithmetic mean as the most probable value of the logarithms of the quantity), we can by substitution find a law of error for the observations themselves which must lead to the geometric mean of them as the most probable value of the quantity itself.

If, as before, the observations are denoted by x_q, &c., and the quantity by x, let their logarithms be denoted by z_q, &c., and by z. Then, if z_q, &c., obey the normal law of error, $f(z_q, z) = \mathrm{A}e^{-k^2(z_q-z)^2}$. Hence the law of error for x_q, &c., is determined by

$$\begin{aligned} f(x_q, x) &= \mathrm{A}e^{-k^2(\log x_1 - \log x)^2} \\ &= \mathrm{A}e^{-k^2\left(\log\frac{x_q}{x}\right)^2}, \end{aligned}$$

and the most probable value of x must, clearly, be the geometric mean of x_q, &c.

This is the law of error which was arrived at by Sir Donald McAlister. It can easily be shown that it is a special case of the generalised form which I have given above of all laws of error leading to the geometric mean. For if we put $\psi(x_q) = -k^2(\log x_q)^2$, and $\phi'(x) = 2k^2 \log x$, we have

$$\begin{aligned} f_q &= Ae^{2k^2 \log x \log \frac{x_q}{x} + \int 2k^2 \frac{\log x}{x} dx - k^2(\log x_q)^2} \\ &= Ae^{2k^2 \log x \log x_q - 2k^2 (\log x)^2 + k^2 (\log x)^2 - k^2 (\log x_q)^2} \\ &= Ae^{-k^2 \left(\log \frac{x_q}{x}\right)^2}. \end{aligned}$$

A similar result has been obtained by Professor J. C. Kapteyn [*Skew Frequency Curves*, p. 22, published by the Astronomical Laboratory at Groningen (1903)]. But he is investigating frequency curves, not laws of error, and this result is merely incidental to his main discussion. His method, however, is not unlike a more generalised form of Sir Donald McAlister's. In order to discover the frequency curve of certain quantities x, he supposes that there are certain other quantities z, functions of the quantities x, which are given by $z = F(x)$, and that the frequency curve of these quantities z is *normal*. By this device he is enabled in the investigation of a type of skew frequency curve, which is likely to be met with often, to utilise certain statistical constants corresponding to those which have been already calculated for the normal curve.

In fact the main advantage both of Sir Donald McAlister's law of error and of Professor Kapteyn's frequency curves lies in the possibility of adapting without much trouble to unsymmetrical phenomena numerous expressions which have been already calculated for the normal law of error and the normal curve of frequency.*

This method of proceeding from arithmetic to geometric laws of error is clearly capable of generalisation. We have dealt with the geometric law which can be derived from the normal arithmetic law. Similarly if we start from the simplest geometric law of error, namely, $f_q = A\left(\frac{x}{x_q}\right)^{k^2x} e^{-k^2x}$, we can easily find, by writing $\log x = y$ and $\log x_q = y_q$, the corresponding arithmetic law, namely, $f_q = Ae^{k^2e^y(y - y_q) - k^2e^y}$, which is obtained from the generalised arithmetic law by putting $\phi(y) = k^2e^y$ and $\psi(y_q) = 0$. And, in general, corresponding to the arithmetic law

$$f_q = Ae^{\phi'(x)(x - x_q) - \phi(x) + \psi(x_q)},$$

we have the geometric law

$$f_q = Ae^{\phi'_1(z) \log \frac{z_q}{z} + \int \frac{\phi_1(z)}{z} dz + \psi_1(z_q)}$$

where

$$x = \log z,\ x_q = \log z_q,\ \int \frac{\phi_1'(z)}{z} dz = \phi(\log z) \text{ and } \psi_1(z_q) = \psi(\log z_q).$$

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* It may be added that Professor Kapteyn's monograph brings forward considerations which would be extremely valuable in determining the types of phenomena to which geometric laws of error are likely to be specially applicable.

(iii.) What law of error does the harmonic mean imply?

In this case, $\Sigma \frac{f'_q}{f_q} = 0$ must be equivalent to $\Sigma\left(\frac{1}{x_q} - \frac{1}{x}\right) = 0$.

Proceeding as before, we find that $f_q = \mathrm{A}e^{\phi'(x)\left[\frac{1}{x_q} - \frac{1}{x}\right] - \int \frac{\phi'(x)}{x^2} dx + \psi(x_q)}$. A simple form of this is obtained by putting $\phi'(x) = -k^2x^2$ and $\psi(x_q) = -k^2x_q$. Then $f_q = \mathrm{A}e^{-\frac{k^2}{x_q}(x-x_q)^2} = \mathrm{A}e^{-k^2\frac{y_q^2}{x_q}}$. With this law, positive and negative errors of the same absolute magnitude are not equally likely.

(iv) If the most probable value of the quantity is equal to the median of the measurements, what is the law of error?

The median is usually defined as the measurement which occupies the middle position when the measurements are ranged in order of magnitude. If the number of measurements m is odd, the most probable value of the quantity is the $\frac{m+1}{2}$th, and, if the number is even, all values between the $\frac{m}{2}$th and the $\left(\frac{m}{2}+1\right)$th are equally probable amongst themselves and more probable than any other. For the present purpose, however, it is necessary to make use of another property of the median, which was known to Fechner (who first introduced the median into use) but which seldom receives as much attention as it deserves. *If x is the median of a number of magnitudes, the sum of the absolute differences (i.e., the difference always reckoned positive) between x and each of the magnitudes is a minimum.* The median x of $x_1\ x_2\ \ldots\ x_m$ is found, that is to say, by making $\sum\limits_1^m |x_q - x|$ a minimum where $|x_q - x|$ is the difference always reckoned positive between x_q and x.

We can now return to the investigation of the law of error corresponding to the median.

Write $|x - x_q| = y_q$. Then since $\sum\limits_1^m y_q$ is to be a minimum we must have $\sum\limits_1^m \frac{x - x_q}{y_q} = 0$. Whence, proceeding as before, we have

$$f_q = \mathrm{A}e^{\int \frac{x-x_q}{y_q}\phi''(x)dx + \psi(x_q)}.$$

The simplest case of this is obtained by putting

$$\phi''(x) = -k^2$$

$$\psi(x_q) = \frac{x - x_q}{y_q}k^2x_q$$

whence $$f_q = \mathrm{A}e^{-k^2|x-x_q|} = \mathrm{A}e^{-k^2y_q}.$$

This satisfies the additional condition that positive and negative errors of equal magnitude are equally likely. Thus in this important respect the median is as satisfactory as the arithmetic mean, and the law of error which leads to it is as simple. It also resembles the normal law in that it is a function of the error *only*, and not of the magnitude of the measurement as well.

The median law of error, $f_q = \mathrm{A}e^{-k^2 y_q}$, where y_q is the absolute amount of the error always reckoned positive, is of some historical interest, because it was the earliest law of error to be formulated. The first attempt to bring the doctrine of averages into definite relation with the theory of probability and with laws of error was published by Laplace in 1774 in a memoir "sur la probabilité des causes par les événemens."* This memoir was not subsequently incorporated in his *Théorie Analytique*, and does not represent his more mature view. In the *Théorie* he drops altogether the law tentatively adopted in the memoir, and lays down the main lines of investigation for the next hundred years by the introduction of the *normal* law of error. The popularity of the normal law, with the arithmetic mean and the method of least squares as its corollaries, has been very largely due to its overwhelming advantages, in comparison with all other laws of error, for the purposes of mathematical development and manipulation. And in addition to these technical advantages, it is probably applicable as a first approximation to a larger and more manageable group of phenomena than any other single law. So powerful a hold indeed did the normal law obtain on the minds of statisticians, that until quite recent times only a few pioneers have seriously considered the possibility of preferring in certain circumstances other means to the arithmetic and other laws of error to the normal. Laplace's earlier memoir fell, therefore, out of remembrance. But it remains interesting, if only for the fact that a law of error there makes its appearance for the first time.

Laplace sets himself the problem in a somewhat simplified form :—"Déterminer le milieu que l'on doit prendre entre trois observations données d'un même phénomène." He begins by assuming a law of error $y = \phi(x)$, where y is the probability of an error x; and finally, by means of a number of somewhat arbitrary assumptions, arrives at the result $\phi(x) = \frac{m}{2} e^{-mx}$. If this formula is to follow from his arguments, x must denote the *absolute* error, always taken positive. It is not unlikely that Laplace was led to this result by considerations other than those by which he attempts to justify it.

Laplace, however, did not notice that his law of error led to the median. For, instead of finding the most probable value, which would have led him straight to it, he seeks the "mean of error"—the value, that is to say, which the true value is as likely to fall short of as to exceed. This value is, for the median law, laborious to find and awkward in the result. Laplace works it out correctly for the case where the observations are no more than three.

§8. I do not think that it is possible to find by this method a law of error which leads to the mode. But the following general formulæ are easily obtained :—

(v) If $\Sigma\theta(x_q, x) = 0$, is the law of relation between the measurements and the most probable value of the quantity, then the law of error $f_q(x_q, x)$ is given by $f_q = \mathrm{A}e^{\int \theta(x_q x)\phi''(x)dx + \psi(x_q)}$. Since f_q lies between 0 and 1, $\int\theta(x_q x)\phi''(x)dx + \psi(x_q) + \log A$ must be negative for all values of x_q and x that are physically possible; and, since the values of x_q are between them exhaustive,

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* *Mémoirs présentés à l'Académie des Sciences*, vol. vi.

$$\Sigma A e^{\int\theta(x_q x)\phi''(x)dx + \psi(x_q)} = 1$$

where the summation is for all terms that can be formed by giving x_q every value *à priori* possible.

(vi) The most general form of the law of error, when it is assumed that positive and negative errors of the same magnitude are equally probable, is $Ae^{-k^2 f(x-x_q)^2}$, where the most probable value of the quantity is given by the equation

$$\Sigma(x - x_q)f'(x - x_q)^2 = 0, \text{ where } f'(x - x_q)^2 = \frac{d}{d(x - x_q)^2} f^{(x-x_q)^2}.$$

The arithmetic mean is a special case of this obtained by putting $f(x-x_q)^2 = (x-x_q)^2$; and the median is a special case obtained by putting $f(x - x_q)^2 = +\sqrt{(x - x_q)^2}$.

We can obtain other special cases by putting

$$f(x - x_q)^2 = (x - x_q)^4,$$

when the law of error is $Ae^{-k^2(x-x_q)^4}$ and the most probable values are the roots of $mx^3 - 3x^2\Sigma x_q + 3x\Sigma x^2_q - \Sigma x_q{}^3 = 0$; and by putting $f(x - x_q)^2 = \log(x - x_q)^2$, when the law of error is $\frac{A}{(x - x_q)^{2k^2}}$ and the most probable values the roots of $\Sigma\frac{1}{x - x_q} = 0$. In all these cases the law is a function of the error only.*

§ 9. In conclusion the preceding results may be summarised. We have assumed :—

(*a.*) That we have no reason, before making measurements, for supposing that the quantity we measure is more likely to have any one of its possible values than any other.

(*b.*) That the errors are independent, in the sense that a *knowledge* of how great an error has been made in one case does not affect our expectation of the probable magnitude of the error in the next.

(*c.*) That the probability of a measurement of given magnitude, when in addition to the *à priori* evidence the real value of the quantity is supposed known, is an algebraic function of this given magnitude of the measurement and of the real value of the quantity.

(*d.*) That we may regard the series of possible values as continuous, without sensible error.

(*e.*) That the *à priori* evidence permits us to assume a law of error of the type specified in (*c*); *i.e.*, that the algebraic function referred to in (*c*) is known to us *à priori*.

Subject to these assumptions, we reached the following conclusions :—

(1.) The most general form of the law of error is

$$f_q = Ae^{\int\phi''(x)\,\theta(x_q x)\,dx + \psi(x_q)},$$

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* *cf.* § 6 (footnote).

leading to the equation $\Sigma\theta(x_q x) = 0$, connecting the most probable value and the actual measurements, where x is the most probable value and x_q, etc., the measurements.

(2.) Assuming that positive and negative errors of the same absolute magnitude are equally likely, the most general form is $f_q = \mathrm{A}e^{-k^2 f(x-x_q)^2}$, leading to the equation $\Sigma(x-x_q)f'(x-x_q)^2 = 0$, where $f'y = \frac{d}{dy}fy$. Of the special cases to which this form gives rise, the most interesting were

(3.) $f_q = \mathrm{A}e^{-k^2(x-x_q)^2} = \mathrm{A}e^{-k^2 y_q^2}$, where $y_q = |x - x_q|$, leading to the arithmetic mean of the measurements as the most probable value of the quantity; and

(4.) $f_q = \mathrm{A}e^{-k^2 y_q}$, leading to the median.

(5.) The most general form leading to the arithmetic mean is $f_q = \mathrm{A}e^{\phi'(x)(x-x_q)-\phi(x)+\psi(x_q)}$, with the special cases (3), and

(6.) $f_q = \mathrm{A}e^{k^2 e^x(x-x_q)-k^2 e^x}$.

(7.) The most general form leading to the geometric mean is $f_q = \mathrm{A}e^{\phi'(x)\log\frac{x_q}{x}+\int\frac{\phi'(x)}{x}dx+\psi(x_q)}$, with the special cases:—

(8.) $f_q = \mathrm{A}\left(\frac{x}{x_q}\right)^{k^2 x} e^{-k^2 x}$, and

(9.) $f_q = \mathrm{A}e^{-k^2\left(\log\frac{x_q}{x}\right)^2}$.

(10.) The most general form leading to the harmonic mean is $f_q = \mathrm{A}\,e^{\phi'(x)\left[\frac{1}{x_q}-\frac{1}{x}\right]-\int\frac{\phi'(x)}{x^2}+\psi(x_q)}$, with the special case

(11.) $f_q = \mathrm{A}e^{-k^2\frac{(x-x_q)^2}{x_q}} = \mathrm{A}e^{-k^2\frac{y_q^2}{x_q}}$.

(12.) The most general form leading to the median is

$$f_q = \mathrm{A}e^{\phi'(x)\frac{x-x_q}{y_q}+\psi(x_q)},$$

with the special case (4).

In each of these expressions, f_q is the probability of a measurement x_q, given that the true value is x.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Commons, forests, and footpaths.* By Lord Eversley. 356 pp., 8vo. London: Cassell and Co., Ltd., 1910. Price 2*s*.

This is a revised and extended edition of the author's well-known work on *English Commons and Forests*, published in 1894. It is issued by the Commons Preservation Society, in a popular form and at a popular price, as a memorial of Lord Eversley's long services to the cause represented by that society, of which he was the founder and has ever been the guiding spirit. In many branches of public life Lord Eversley has played a prominent part—among them, as these pages may fittingly recall, the presidency, in 1877-79, of this Society—but probably none of his activities have been nearer to his heart, as none can have more nearly realised his hopes, than his unremitting labours for the recognition of the rights of the people in the commons. The story of the long fight for the commons in and near London, which, but for the efforts of Lord Eversley and the society, would many of them now be engulfed in the wilderness of bricks and mortar, and the persistent siege of Parliament, which resulted in the Commons Acts of 1876, 1893, and 1899, reversing in effect the general principles and objects of previous legislation on the subject, is told with the fullness of knowledge possessed by a leader in the strife, and with the fairness and sense of proportion of one whose breadth of view has been cultivated by long years of public responsibility.

The greater part of the book is devoted to the history of some of the great struggles for particular areas which were endangered, *e.g.*, Epping Forest, Berkhamsted Common, Hampstead Heath, Wimbledon Common, Ashdown Forest, Banstead Downs, and many others. Each case had its special features; the extraordinary variety of circumstances which may affect different areas being one of the chief difficulties in dealing with them, while, in retrospect, it greatly increases the interest of their history. Special chapters are devoted to village greens, roadside wastes, and rights of way, subjects which are involved in the questions of commons generally, though each has, so to speak, its own particular body of law and practice. The chapters in which the Parliamentary history of the subject is recorded are especially interesting, and incidentally they demonstrate that the House of Commons was very apt, on occasion, to take action independently of, and in opposition to, the Government of the day. A brief but lucid sketch of the origin and history of commons serves as an introductory chapter. The vexed and tangled story of inclosures is, of course, only outlined, but Lord Eversley notes that up to the time of the General Inclosure Act of 1845 over 4,700 separate Inclosure Acts were passed, involving an area variously estimated at between 5,000,000 and 7,175,000 acres. He observes that the addition of this large area to the cultivated land of England and Wales "was doubtless of considerable advantage by adding to its productive power, and by affording additional employment for labourers in rural districts," but he goes on to point out that from the method in which these inclosures were carried out they were "not an unmixed benefit," and he specially refers to their injurious effect on small holders. Lord Eversley alludes also to the fact that there is no accurate information as to the number and area of commons which still remain uninclosed. In 1871 an early official estimate of 8,000,000 acres was still accepted, but only two years later a return presented to Parliament put the total area at 2,633,000 acres, and in 1875 still another total—of 1,524,648 acres—was arrived at in the Return of Owners of Land prepared by the Local Government Board. Setting aside the earlier figure, which has been generally rejected, the two later returns have been much criticised. Sir Robert Hunter, in his paper on the "Inclosure and Preservation of Open Lands," read before this Society in 1897,[1] remarked that neither can be regarded as "of conclusive authority," and suggested that the true figure lay between the two! That, however, can scarcely be considered as a satisfactory statistical conclusion. R.H.R.

2.—*The Jews: a study of race and environment.* By Maurice Fishberg. xx + 578 pp., 8vo. London: Walter Scott Publishing Co., Ltd., 1911. Price 6*s*.

The literature on Jewish statistics is both voluminous and scattered, and Mr. Fishberg's contention that an attempt to present the results of anthropological, demographic, pathological and sociological investigations of the Jews was needed, will be readily conceded. In the first chapter of the present work, estimates of the numbers of the Jews in different countries are given, and the following six chapters are then devoted to their physical characteristics, the types of Jews and their origins. After a somewhat detailed consideration of proselytism and intermarriage, Dr. Fishberg then proceeds to consider the demographic statistics —fertility, illegitimacy, marriage rates, and mortality—and pathological characters. To social and economic conditions, the education of the Jews in various countries, occupations and criminality four further chapters are devoted. The remainder deal mainly with political conditions and social disabilities, and the question of assimilation.

It will be seen that the author has endeavoured to cover a very wide field, and the data which he has brought together will certainly be of service to the student; there is also a bibliography of some ten pages at the end of the volume. But in some respects the work is hardly entirely satisfactory. Partly, no doubt, this unfavourable impression may be ascribed to causes altogether beyond the author's control: it is in no way his fault that the available data are extremely sporadic and frequently incomparable. Many passages appear, however, to give evidence of hasty and careless writing. Statements may be cited at intervals of a few pages which stand in direct contradiction with one another: thus, on page 272, we read "It is a well-known fact that a drunken Jew is rarely met with in any part of the world . . . . Even among the poor and dependent Jews drunkenness is extremely rare." On page 275, however, quite a different picture is presented: "In England and in the United States the immigrant Jews are quite temperate, and a drunkard is rare among them. But among their descendants drunkenness is becoming more and more common. The same is reported to be true of the Jewish immigrants to Paris . . . . While in former times it was rare for a Jew to be seen in a hospital for the treatment of dipsomania, there are many cases seen at present in the United States and in Germany." Again, we find repeatedly careless forms of statistical statement; *e.g.* (page 243), "It is evident that illegitimacy is less frequent among Jews than among others. I find that about 5 illegitimate children are born to Christians in Bavaria to 1 among Jews; in Amsterdam and Warsaw, 7 to 1," and so on. It is surely obvious that such a statement is meaningless unless we know something of the relative proportions of Jews and Christians; we cannot help wondering, indeed, whether Dr. Fishberg has said precisely what he meant. Again, such a statement as (page 259): "In Prussia . . . . the mortality of Jews under 15 years of age was less than one-half that of the Christians. In 1906, 53·1 per cent. of all the deaths among the latter in Prussia occurred in individuals less than 15 years of age, while among the Jews only 18·58 per cent. of all the deaths were in persons of these ages," would seem to indicate that the author is not accustomed to the handling of vital statistics. The figures given do not afford any indication of the relative mortalities.

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[1] *Journal of the Royal Statistical Society*, lx, part ii.

The work, moreover, appears to have been written with a definite and somewhat polemical aim, and not solely as a scientific study; it is, in fact, rather an unfortunate mixture of a sociological monograph with a tract against Zionism. The author holds strongly that the prevailing opinion as to the Jews having maintained themselves in racial purity is baseless; that there is, practically speaking, no such thing as a Jewish race; and that, sooner or later, the Jews are bound to be assimilated with the peoples amongst whom they dwell. In almost every chapter he endeavours to enforce the lack of any differences which can, with any confidence, be described as racial. In this aim he is not altogether successful. A marked differentiation of the Jews in different countries is indeed clearly indicated, but the author does not always give the necessary data for judging their differentiation from the people amongst whom they live. Where such data are given, the differentiation, for certain characters at least, seems clear. G.U.Y.

3.—*Le popolazioni delle grandi città Italiani.* By Giorgio Mortara. 411 pp., 8vo. Turin: Unione Tip.-Ed. Torinese., 1908. Price 10 lire.

The growth of great cities is one of the most interesting developments of modern civilisation. There have been at work in Italy forces causing this tendency to be less marked than in some other countries. Quite apart from the fact that, until the unification, there was no one preponderant centre of attraction comparable to the capitals of other countries, the growth of the large towns in the different politically separate States was checked by the difficulty of applying modern sanitary science in ancient cities with the same measure of success as in younger centres of population. But, even so, we find that the population in both Catania and Milan (as well as Rome) show an increase in the last half century of over 100 per cent., as compared with an increase of only 30 per cent. in the whole kingdom, and that six others of the eleven Italian cities with a population exceeding 100,000, have also grown at a greater rate than the population as a whole. It is these eleven cities, comprising one-tenth of the whole population, that Signor Mortara sets out to study. With such material as exists Government and municipal publications, often unsatisfactory and difficult of comparison—he investigates their demographic characteristics, and by so doing, hopes to throw some light on the causes of their increase. Carefully explaining his methods as he proceeds, he first discusses and analyses statistics of the increase, both natural (marriages, births, deaths) and artificial (immigration), in the eleven cities, and then considers the present composition of their population, as regards sex, civil status, age, place of birth and occupation. This elaborate study is followed by a short concluding chapter giving Professor Mortara's observations on the causes of the growth of great cities. These contain many points of interest, if their connection with the preceding statistical part of the work seems but slight. Signor Mortara attempts no international comparisons, holding this to be too vast an undertaking in a book for which he does not claim the rank of a complete scientific treatise. S.S.

4.—*Other New Publications.*[*]

[These notes do not preclude a fuller review in a later issue of the Journal.]

Barker (*D. A.*). Cash and Credit. vi + 143 pp., 8vo. Cambridge: The University Press, 1910. Price 1s. net.

[Written with the object of providing the reader with a firm grasp of the elementary principles of money and credit, and also of the theory of money in its practical aspects.]

Bourgin (*Georges*). Statistiques Révolutionnaires. Description du Département d'Eure-et-Loir, an II. (Extract from "Revue d'Histoire des Doctrines Économiques et Sociales.") 14 pp. 8vo. Paris: Paul Geuthner, 1910.

[This pamphlet is a reprint of a fragment of an official enquiry in regard to population, agricultural condition, prices of land and live stock, and wages in one of the Departments at the time of the French Revolution. There is a short introductory note by M. Bourgin.]

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[*] See also "Additions to the Library," page 362, *sqq.*

Brentano (*Lujo*). Die Deutschen Getreidezölle. Eine Denkschrift. Zweite, neu bearbeitete Auflage. 124 pp., 4to. Stuttgart: J. G. Cotta'sche Buchhandlung, 1911.

[The second edition of a study of the German duties on corn and of their influences on German agriculture and on the different classes of the community. There is an extensive statistical appendix.]

Broomhall (*G. J. S.*). Annual Review of the Grain Trade. iii + 102 pp., 8vo. Liverpool: Northern Publishing Co. Ltd. Price 2*s.* 6*d.*

[A useful compilation of the latest statistical and other information as to the harvests, imports and exports of cereals in all the principal countries of the world.]

Cunningham (*Audrey*). British Credit in the last Napoleonic War. With an Appendix containing a reprint of "Des Finances de l'Angleterre" by H. Lasalle. vi + 146 pp., 8vo. Cambridge: The Cambridge University Press, 1910. Price 2*s.* net.

[An endeavour to show that the decrees of Napoleon I were intended as an attack on British credit. Their failure is attributed to his underestimating the commercial power of England, and also to the fact that such an attack was anticipated.]

Dean (*Arthur D.*). The Worker and the State. A study of Education for Industrial Workers in the United States. With an Introduction by Andrew S. Draper. xix + 355 pp., sm. 8vo. London: T. Werner Laurie, 1911.

[A study of the social conditions of industrial workers in the United States.]

Drage (*Geoffrey*). The Imperial Organisation of Trade. xviii + 374 pp., 8vo. London: Smith, Elder and Co., 1911. Price 10*s.* 6*d.* net.

[This book, dealing only with trade, is an instalment of a larger work on Imperial organisation in general. It is published in the hope of advancing the closer commercial union of the Empire, without hurting the susceptibilities of either Free Traders or Tariff Reformers, at the Imperial Conference which meets this year. The book is divided into six chapters, with appendices and a full index.]

Harris (*J. Theodore*). An Example of Communal Currency: The facts about the Guernsey Market House. With a Preface by Sidney Webb, LL.B. xiv + 62 pp., 8vo. London: P. S. King and Son, 1911. Price 1*s.* 6*d.* net.

[An account taken from official records of the building of the Guernsey Market Hall by the Island authorities, without borrowing, the money being raised by means of non-interest-bearing notes circulating in the Island, and ultimately redeemed out of the annual market revenues.]

Hirst (*F. W.*). The National Expenditure of the United Kingdom. 100 pp., sm. 8vo. London: "The Economist," 1911. Price 1*s.*

[A memorandum drawn up by the editor and the staff of the *Economist*, and submitted some time ago to Mr. Asquith and to the Chancellor of the Exchequer, is the basis of this book, which is issued to the public in the hope that it may be the means of promoting large economies in the public service.]

Keith (*Theodora*). Commercial relations of England and Scotland. 1603-1707. With a preface by W. Cunningham, D.D. xxiii + 210 pp., 8vo. Cambridge: The Cambridge University Press, 1910. Price 2*s.* net.

[An interesting account of the commercial relations of the two countries in the first hundred years after the Union of 1603, which intensified rather than mitigated commercial rivalries.]

Lavergne (*L. A. de*) and *Henry* (*Paul*). Le Chômage. Causes, Conséquences, Remèdes. 420 pp., 8vo. Paris: Marcel Rivière and Co., 1910. Price 8 fr.

[An exhaustive study of unemployment in different countries. The book has been "couronné" by the French Academy of Moral and Political Sciences, and awarded the "Bordin" prize. It is divided into nine chapters dealing, among other subjects, with statistics of unemployment, preventive and curative methods, State insurance, and State grants to existing institutions.]

Mayr (*Dr. Georg von*). Begriff und Gliederung der Staatswissenschaften. Zur Einfuhrung in deren Studium. Dritte umgearbeitete und vermehrte Auslage. viii + 182 pp., 8vo. Tübingen: H. Laupp'schen, 1910.

[This is a third edition of Dr. von Mayr's well-known treatise on Political Science. The book has been revised and considerably extended,]

Mills (*J. Saxon*). England's Foundation: Agriculture and the State. With a Preface by the Right Hon. the Earl of Denbigh. v + 90 pp., sm. 8vo. London: P. S. King and Son, 1911. Price 1*s.* net.

[Deals with the economic effects of the existing fiscal system on the agricultural industry.]

Schott (*S.*). Alles Ding währt seine Zeit. Feriengedanken eines Statistikers. 27 pp., 8vo. Mannheim: Mannheimer Vereinsdruckerei, 1911.

Touzet (*André*). Emplois industriels des Métaux Précieux. Étude économique et juridique. 696 pp., 8vo. Paris: Giard and E. Brière, 1911. Price 12 fr. 50 c.

[An elaborate study of the industrial consumption of the precious metals, and of its varying influences. The book is divided into four parts, the first dealing with the statistical data available as to such consumption, the second with its influence on the purchasing power of money, the third with legislation regulating the industries concerned, and the fourth with an examination of the present condition of these industries in France and Germany and of those engaged therein.]

Viviani (*Réné*). Les Retraites Ouvrières et Paysannes. Discussion de la Loi au Sénat et à la Chambre des Députés. xxvii + 564 pp., sm. 8vo. Paris: V. Giard and E. Brière, 1910. Price 6 frs.

[A reprint of the speeches of M. Viviani, the French Minister of Labour, in the debates in the Senate and in the Chamber of Deputies prior to the passing of the French Old Age Pension Law, which affects some 17,000,000 persons. The book is divided into some fifty parts on special sections of the law, each prefaced by a short note explaining the purport of the discussion that follows. This adds considerably to the utility of the book.]

Webb (*Herbert Laws*). The Development of the Telephone in Europe. With an Introduction by Harold Cox. 78 pp., 8vo. London: Electrical Press Ltd., 1911.

[An historical account of the working and development of the telephone in this and other countries. The author is opposed to State control of a telephonic or telegraphic system, and considers that the State by its organisation is ill adapted for commercial enterprise. His object is to show that where the telephone has been under commercial management its development has been higher than where it has been a State monopoly. There is an introduction by Mr. Harold Cox.]

Germany. Das Jubiläum der Unfall- und der Invalidenversicherung. Bericht über die Feier herausgegeben vom Festausschuss. 8vo. Berlin: H. S. Hermann, 1910.

Germany. 25 Jahre Unfall- und Invalidenversicherung von Dr. Paul Kaufmann. Rede bei der Jubelfeier der Unfall- und Invalidenversicherung am. 1. Oktober 1910. 8vo. Berlin: Behrend and Co., 1910.

[An account of the festivities in celebration of the 25th anniversary of the German State Insurance system for providing invalid and old-age pensions and assistance in the case of temporary illness and of accidents occurring in the course of employment.]

Italy. Manuale pratico quinto Censimento generale della Popolazione e sul primo Censimento Industriale. 2 parts, sm. 8vo. Firenze: Biblioteca di Legislazione amministrativa, 1910.

[Contains the laws, regulations and copies of the schedules to be used in the fifth general census and first industrial census to be taken in Italy on June 11, 1911.]

——— Le condizioni di lavoro nell' industria laterizia in Italia. Fol. Rome: Officina Poligrafica Italiana, 1910.

[A report on the social conditions, wages and hours of labour of those employed in the brickmaking industries in Italy]

United States. American Economic Association Quarterly. American Silk Industry and the Tariff. By Frank R. Mason, A.M. December, 1910. 8vo. Cambridge: American Economic Association, 1911.

[A study of the American silk industry and of its relation to the Customs tariff. In the opinion of the author, no better example exists in the United States of an industry created and built up under the protection of high tariff duties. The book is divided into five parts, and has a summary table of contents and a bibliography.]

CORRESPONDENCE.

Influence of Parental Alcoholism.

To the Editors of the "Journal of the Royal Statistical Society."

SIRS,—1. I feel most unwilling to prolong a controversy in which sufficient *data* are already before the public, if they be carefully studied, to enable a fair decision to be arrived at between the arguments of the contending parties. But some passages in Professor Pearson's letter in the January number of this JOURNAL have thrown so much light on what was previously obscure, that it seems worth while to point out their bearing on some of his earlier statements. I think that it may also be desirable to summarise as briefly as possible the *main* points on which a difference of opinion seems still to exist. The discussion has become so much overlaid with matters of detail, which are not essential to the main contentions of either side, that it has become exceedingly important to emphasise and distinguish from the rest those differences of opinion that really matter.[1]

2. The main questions which have been in dispute between Professor Pearson and myself have been the three following:—

(i.) Whether the selected district of Edinburgh can be rightly described as a low district or slum.

(ii.) Whether, even if (i) is answered in the affirmative, the low and consequently non-representative character of the district would affect in any way the validity of Professor Pearson's generalisations.

(iii.) Whether the calculations of Professor Pearson and Miss Elderton, according to which the average weekly wages of a drinking and of a sober man do not differ by more than 1s., made full allowance for irregularities of employment.

3. With regard to (i) I have nothing to add to my previous

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[1] I shall, therefore, ignore several minor points in Professor Pearson's letter to which I should wish to make some reply, if they were more important in relation to the scientific problem which we are discussing. I owe him, however, a brief explanation on two points on which inadvertently I have given him a ground of complaint. In the opening passages of his letter he reproaches me for tacitly changing his expression "drinks" into "drunken," and thereby introducing bias and begging the question. I, with no such intention, was quoting the phraseology of the Edinburgh report (p. 17):—"In the less detailed tables all that did not come under the head of 'sober' or 'teetotal' families were put under the heading 'drunken' families; for all were, in a less or greater degree, those who suffered in health, diet, and morals from the presence of drinking habits." Secondly (p. 228) he points out that I misquoted the wage estimate given in his original "Memoir." I am sorry for the mistake. I quoted the wage estimate given in his later pamphlet, and then attributed it to the "Memoir," forgetting for the moment that the wage estimates, which Professor Pearson has given in different parts of his writings, are not consistent.

argument. Professor Pearson mainly relies still, as he relied at the beginning, upon a statement in the Edinburgh report that the selected school had "a widely representative character." Whether the investigators meant to imply by this that the population from which it was drawn was a fair average sample of the general population, is not clear from the passage which Professor Pearson quotes. Taken in conjunction with other statements[2] in the Edinburgh report it will not, in my opinion, bear this interpretation.

In describing the district as low-grade, on the whole and in spite of some exceptions, I relied upon (*a*) the high figures of alcoholism; (*b*) the large percentage in receipt of charitable relief; (*c*) the great overcrowding as compared with the rest of Edinburgh; (*d*) the stunted physique of the children as compared with children in other parts of Edinburgh. Professor Pearson has given his reasons for attaching no importance to these facts.

Lastly, I have relied upon a very careful study of the individual families as described in the Edinburgh report. I do not find it possible to regard the conditions there set forth as normal, although Professor Pearson, writing in the more lively atmosphere of the Eugenics Laboratory, suspects that my situation precludes real knowledge.[3]

4. To (ii), which supported the main part of the argument in Professor Pearson's original reply to my review, and to which I devoted a large part of my contribution to the December JOURNAL, Professor Pearson makes no reference in his recent letter. I may perhaps assume, therefore, that we are no longer in disagreement on this point.

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[2] In the *Foreword* to this Report, for example, it is stated that in the lowness of its moral standards the district is exceptional:—"The following pages show that while the economic factor is not absent from the poverty problem in the city, and while ill-housing (as elsewhere in Scotland) is painfully prevalent, moral causes are present in exceptional measure, and much of the degradation of the people and the suffering of the children is plainly and irrefutably attributable to an excessive indulgence in strong drink." On page 3 the investigators point out that, although Edinburgh is not a city specially noted for the preponderance of female employment, a considerable proportion of the mothers in the selected district were found to be wage-earners, and they add that in these cases "the children run more in the streets, and are fed more than ever on 'pieces' instead of by regular meals." With regard to housing, they state (page 3): "All houses in the city with a cubic content of 2,000 cubic feet and under are 'ticketed.' The proportion of ticketed houses out of the total number visited was rather over one-fifth of the whole number." I have already quoted in this JOURNAL the comparison made by the investigators between the heights of these and of other Scottish children, on which they comment (page 22) that: "It gives a sadder emphasis to the lesser heights of the children in the selected school."

[3] Pamphlet, p. 22:—"It is not the members of the Eugenics Laboratory, but the Cambridge economists in their cloistered studies, who exhibit ignorance, when they try to demonstrate that the Edinburgh sample belongs to an exceptionally 'low grade' population in which 'physical and moral squalor are rampant.'"

5. It is with regard to (iii) that new light has been chiefly forthcoming. In the original memoir (p. 4) the authors wrote as follows: "We find that the wages of a drinking man are on the average 25*s*., and a non-drinking man 26*s*. It would be reasonable to suppose that the 6*d*. or 1*s*. difference shown in the above results is what the employer is willing to pay for the convenience of sobriety." The term "wages" (whether trade wages or average wages) as used in this passage is ambiguous, and, to clear this point up, Dr. Marshall, in writing to *The Times*, questioned whether the figures made full allowance for irregularities of employment. Professor Pearson replied in the affirmative. "Where there was a difference," he wrote (*The Times*, July 12, 1910), "between the trade wages of fathers and the average wages actually received, the latter were used and not the former." In the *Daily Chronicle*, (November 1, 1910), he claimed to have shown that "the sober and the alcoholic followed the same trades, *got just the same wages*,[4] and lived in the same houses." Professor Pearson now knows that when he wrote the above sentences he was under a misapprehension as to the methods which his collaborator, Miss Elderton, had adopted in compiling the wage statistics. As a consequence of the inquiries which my last letter has prompted him to make, he now explains that the estimates given in the original memoir did *not* allow for irregularity of employment, and did *not* take in every case "the average wages actually received." "*Making no allowance for irregularity of work*," he now writes, "but including the 'average' wages, *when known*, the mean wages come out, for the sober, 26*s*. 1*d*., and 25*s*. for the drinking section."[4] *This* was the basis of the estimate in the original memoir. In fact, he now wonders why he need ever have troubled about the wages actually received. "It is clear," he points out in his last letter, "that a wage averaged over wageless periods induced by excessive drinking would cause us to underestimate the capacity of the alcoholic section, and that the nearer we can get to the wage the man would earn in his normal state, the nearer we shall be to the wage as true index of his non-alcoholic capacity." In my letter to this JOURNAL for December, 1910, I laboriously proved that Professor Pearson, after classifying the men into their trades, "had then put against them the wages they *might* have earned, not those which they actually do earn." I have not merely converted Professor Pearson to this way of thinking. He glories in his new faith. There are no longer, therefore, any adherents to the opinion that the average wages actually earned by drinkers and by the sober differ by less than a shilling.

6. I pointed out in my last letter that, *if* Professor Pearson had proved that the sober and the alcoholic got just the same wages, this, so far from assisting his main contention would irretrievably damage it.[5] This view, also, Professor Pearson has now adopted with enthusiasm, and, further, with admirable celerity.

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[4] My italics.

[5] *Journal of the Royal Statistical Society*, December, 1910, p. 117 (top paragraph and footnote).

attributes his former opinion to me.[6] In fact Professor Pearson has adopted *en bloc* my argument that he ought to prove that "the Edinburgh drunkards were on a par with the other inhabitants of the district, *before they drank or if they had not drunk*,"[7] and hastens to familiarise his statistics with the new duties now required of them.

7. Over the table of trades and wages I will not waste more time. Following, as I still maintain, the natural interpretation and the context of his words, I supposed that the wages given in this table referred to the wages of the same individuals as those whose trades were tabulated. My detailed investigation of the table, based upon this supposition, has elicited from Professor Pearson the explanation that the table was never intended to have any bearing upon wages, and that it was *nothing more* than a classification into trades. Professor Pearson's admission, that his nine porters were in fact one guard, two checkers, one stoker, one railwayman, one painter, one platelayer, and two porters, with earnings from 45s. downwards, seems, however, to suggest that even for this purpose the usefulness of the table has its limitations.

8. Leaving all details on one side, let me now recapitulate those amongst the conclusions of Professor Pearson and Miss Elderton, and those amongst the criticisms directed against them which really matter. To the question of alcoholism and wages, which was at the outset no more than an *obiter dictum* of the joint anthors, and was no part of their main contention, I shall make no further reference. The misunderstandings to which this has given rise are now cleared up.

Three distinct problems have been intermingled throughout:—

(1) The prenatal influence on offspring of alcoholic habits in the parents.

(2) The postnatal and environmental influence of alcoholic homes.

(3) The influence of hereditary characteristics commonly associated with, but not caused by, alcoholic habits.

In studying the Edinburgh data the first two only were kept in view, it being, perhaps,[8] assumed that the third does not serve by itself to differentiate the children of alcoholics from other children to any marked degree. Between the separate effects of the influence of the first two it was, from the nature of the case, impossible to distinguish. But as Professor Pearson and Miss Elderton found no decisive difference between the children of alcoholics and non-alcoholics, they concluded, so far as I understand their somewhat ambiguous summary (pp. 31, 32), that *neither* parental alcoholism in parents *nor* alcoholic environment after birth exert a markedly evil influence upon offspring. But they were *mainly* thinking, if I follow their meaning correctly, of the influence of environment. Before they commenced their investigation "there was still," they say (p. 31), "a reasonable anticipation that alcoholism in the parent would be found to have not only, through the direct and cross factors of heredity, a marked influence on the child, but toxic and environmental effects of possibly an even graver kind . . . . Here at least we anticipated that marked environmental effects would be found and quantitatively defined." The novelty and importance of their results lay in the fact that they contradicted, in the authors' opinion, this reasonable anticipation. On the other hand the result was not altogether surprising to them, because it was consistent with the conclusion, to which investigations in other fields had already led them, that common experience generally tends to attribute an exaggerated importance to the influences of environment. The Edinburgh *data* supported, therefore, the general contention, to which other investigations carried out in the Eugenics Laboratory had pointed, that the influences on children of acquired characters in parents and of prenatal and of postnatal environment count for little as compared with the influences of strictly original heredity. The practical conclusion, which seemed to follow, was this,—that a policy on the part of temperance reformers, however desirable on *other* grounds, of preventing drunkenness by every means in their power, will do very little for the children. The improvement of the next generation must be effected by other means.

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[6] "Mr. Keynes and Professor Marshall seem to suppose that the equality of the wages of the sober and alcoholic groups is necessary for our position, that the parental alcoholism has no marked effect on the offspring." I never supposed this, and expressly pointed out that it was *incompatible* with his main contention. I denied the approximate equality of wages, because it seemed to me untrue, and not with a view of assisting some other part of my argument.

[7] My letter to the *Journal of the Royal Statistical Society*, December, 1910, p. 116.

[8] But *cf.* the passage, quoted later on, from page 31 of the "Memoir." It would be rash to attribute to Profsssor Pearson too precise an opinion as to the assumptions he was making.

9. The criticisms, to which the above argument has given rise, have followed a great variety of lines, and in defending himself Professor Pearson has been led, as controversialists are apt to be, into much more unguarded statements than any which are to be found in the original memoir. The discussion has also been diverted into disputes about words and details, where neither successful attack nor successful defence could possibly affect the main issue. The following emerge, I think, as the vital criticisms which Professor Pearson has not been able to rebut.

There come first the medical criticisms, which have been urged with great force by Dr. Mary Sturge and Sir Victor Horsley in the *British Medical Journal* and elsewhere :—

(i.) The Edinburgh *data* afford no solution of problem (1), namely, the prenatal influence on offspring of alcoholic habits in the parents. For there is no means of knowing which of the Edinburgh parents had contracted alcoholic habits *before* the birth of the children and which had not. Professor Pearson has replied that we can reasonably assume that *some* of his alcoholic parents were alcoholic before the birth of their children. But this is no adequate answer. Unless *most* of the parents were alcoholic before the birth of the children, any toxic effect that may exist might easily be concealed in an investigation on so moderate a scale as this one.

(ii.) The classification into alcoholic and non-alcoholic is not satisfactory. A negligible number of Professor Pearson's non-alcoholics were teetotallers. Many of those, who did not carry the consumption of alcohol to the point of obvious excess, may nevertheless have drunk enough to affect their offspring injuriously.

There come next the statistical criticisms. These all amount, in effect, to the contention that Professor Pearson's assumption of initial equality (*i.e.*, if alcoholic habits had not been contracted) between his alcoholic and non-alcoholic parents is unjustifiable. Hence an eventual equality amongst the offspring is no disproof of the injurious influence of alcohol. This is a most fundamental criticism, because it does not only apply, as the medical criticisms do, to the actual lack of proper precautions in this particular case, but to almost all possible investigations on these lines. It can be put in a variety of forms:—

(iii.) Professor Pearson's sample is drawn from a low district, and is not, therefore, representative. A drinking man may come to live there for that reason only; a non-drinker is probably driven there by disease or incapacity of some other kind. Professor Pearson, in reply to this, will not admit that his district is unrepresentative.

(iv.) The same criticism, though in less degree, applies to the selection of *any* district. Drinking habits may drive a man to a lower district, if only because he has less to spend on rent, than that which he would otherwise inhabit.[9]

(v.) We have no right to assume without proof that the influence of hereditary characteristics commonly associated with, but not caused by, alcoholic habits, has on the balance no differential effect. Unless we can demonstrate this, an approximate equality between the children of *all* alcoholics and of *all* teetotallers, even if it were to be found over the whole country, would not disprove the injurious influence of parental alcoholism. Professor Pearson has himself suggested that the equality he has found in Edinburgh may be due "to certain physical and mental characters which appear to be associated with the tendency to alcohol." If this is true, there *must* be a toxic or environmental influence on children of an injurious kind arising out of parental alcoholism, if we find the children of alcoholics *no better* than the children of non-alcoholics.

Professor Pearson has acted very ill in encouraging the promulgation in the daily Press of decided opinions, on such a subject as this, which are founded not only upon partial *data*, but, even if they are to follow from these, upon hypothetical and uninvestigated assumptions.

10. The following are, I think, the conclusions at which we ought to arrive. With regard to problems (1) and (3), in para. 8, there is no evidence which justifies us in holding any decided opinion. With regard to problem (2), a large mass of general experience makes it exceedingly probable, as Professor Pearson admits, apart from his Edinburgh investigation, that alcoholic homes exert in general an evil environmental influence upon children. To the solution of none

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[9] *Cf.* Professor Pigou, *Westminster Gazette*, February 2, 1911, for criticisms (iv) and (v).

of these problems does the nature of the Edinburgh *data* permit that any substantial contribution should be made, and the Eugenics Laboratory Memoir leaves matters exactly where they were. The problems are, moreover, so complicated, and the effects of the three distinct influences so indistinguishable when we deal with instances in the mass, that they seem to invite the application of experimental rather than statistical methods. The discovery of suitable conditions for the application of the latter seems most unlikely. I can imagine only one set of circumstances in which they could be used with real hope of success;—namely, if we had a numerous set of parents who, beginning married life as teetotallers, had some children, and after taking to drink later, then had some more.[10] We could then compare those who were conceived and brought up in temperance with those, born of the same parents, who were conceived and brought up in drunkenness. Unless a band of teetotal parents, who already fulfil the first condition, will submit, in the paramount interests of science, to qualify themselves for the second, the statistical method is unlikely to find a proper field for the exercise of its operations.

I am, Sirs, &c.,
J. M. Keynes.

King's College, Cambridge,
February 9, 1911.

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[10] A secondary investigation being carried on at the same time, amongst a population which did not change its habits, to discover whether any correlation exists between the fitness of children and the age of the parents when the children were born.

CURRENT NOTES.

The trade returns for the past month are again very satisfactory. As compared with January, 1910, there is an increase of 6,785,087*l.*, or 12·1 per cent. in imports, and an increase of 2,927,716*l.*, or 8·4 per cent. in exports. Re-exports show an increase of 494,308*l.*, or 6 per cent. The figures for the twelve months ending January, 1911, are summarised in the subjoined tables :—

[000's omitted.]

Imports.	Twelve months ending January, 1911.	Twelve months ending January, 1910.	Increase (+).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	256,806,	256,757,	+ 49,
II. Raw materials and articles mainly unmanufactured	268,285,	218,792,	+ 49,493,
III. Articles wholly or mainly manufactured	157,547,	149,032,	+ 8,515,
IV. Miscellaneous and unclassified (including parcel post)	2,587,	2,533,	+ 54,
Total merchandise	685,225,	627,114,	+ 58,111,
Imports of bullion and specie	71,588,	59,891,	+ 11,697,

[000's omitted.]

Exports.	Twelve months ending January, 1911.	Twelve months ending January, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	26,514,	23,514,	+ 3,000,
II. Raw materials and articles mainly unmanufactured	53,735,	51,422,	+ 2,313,
III. Articles wholly or mainly manufactured	345,079,	302,450,	+ 42,629,
IV. Miscellaneous and unclassified (including parcel post)	8,189,	6,794,	+ 1,395,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,188,	11,987,	+ 1,201,
II. Raw materials and articles mainly unmanufactured	63,466,	55,664,	+ 7,802,
III. Articles wholly or mainly manufactured	27,477,	24,862,	+ 2,615,
IV. Miscellaneous and unclassified (including parcel post)	211,	292,	− 81,
Total, British, foreign and colonial	104,342,	92,805,	+ 11,537,
Exports of bullion and specie	66,916,	57,509,	+ 9,407,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending January, 1911.	Twelve months ending January, 1910.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	41,829,	40,498,	+ 1,331,
Total, British and foreign, *cleared* with cargoes	57,744,	57,092,	+ 652,

Mr. Sauerbeck's index-number of prices for January, 1911, is 78·5, as against 77·9 in December, 1910, the average of the eleven years, 1867-77, being taken as 100. There was scarcely any change in articles of food, but materials were somewhat higher, partly owing to a rise in the value of tin, partly owing to higher prices for linseed. Other articles showed very little change; jute was higher, but wool somewhat cheaper. There was a firmer tendency for export coal. Articles of food were 71·4, as compared with 71·3 in December, and materials were 83·7, as compared with 82·8. Silver was weaker during the month.

The *Economist* of February 4 contains the interesting announcement that in order to make the monthly review of prices, which has been given in that journal for the last forty-seven years, more far-reaching, it is proposed to embody in the index-number quotations of some important articles which play a large part in modern commerce, while at the same time retaining its character as a wholesale market index-number. It is pointed out that great changes have occurred in the course of the last fifty years in the nature of the commodities which enter into general consumption, and are, therefore, dealt in on the world markets. In 1845-50, for example, British wheat supplied most of our requirements, whereas to-day the quotations for British wheat are at certain periods of the year almost nominal; and the steel, petroleum, rubber and the chemical trades were at that time in their infancy. The chief commodities to be added are coal, steel rails, petroleum, rubber, oil, seeds, jute, soda crystals, rice, barley and oats. These additions will bring under regular review a number of markets of very great importance. It has thus become necessary to adopt a new basis, and for this purpose the first quinquennial period of the twentieth century has been chosen, which at once avoids the boom of 1907, and is sufficiently recent to include standardised quotations of modern commodities. The prices which are now to be included in the calculation of the index-number are grouped with those of other articles, the several groups being assigned such weights as leave the aggregate number at 2,200 for the standard period. Cereals and roots, textiles, and the miscellaneous group are each given a weight of 500 at the standard period, while minerals receive a weight of 400 and "other foods" a weight of 300. The new index-number for the end of December last is worked out at 2,503, which may be compared with the figure of 2,513 on the old basis given in the number of the *Economist* for January 7, while the numbers for the end of January are, on the old basis 2,528, on the new basis 2,523. The average of the monthly numbers on the old basis for the years 1901-05 was about 5 per cent. lower than the new standard figure of 2,200 for that period. It appears, however, that at the end of 1910 the new and old numbers were sufficiently close to permit of practically continuous record without adjustment for differences of level. In connection with this announcement, the publication is promised in the near future of a brief history of the *Economist* index-number from its commencement to the present day.

According to the Board of Trade *Labour Gazette*, the state of the labour market during December, 1910, was as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
December, 1910	415	700,665	34,834	5·0
November, 1910	416	680,524	31,276	4·6
December, 1909	416	692,153	45,963	6·6

Employment in December was, on the whole, about the same as in November. There was a marked improvement in the shipbuilding industry following on the termination of the boilermakers' dispute, and the iron and steel trades were also favourably affected. There was a seasonal decline in the building, furnishing, and some of the clothing trades, and the printing trade showed a considerable decline in the latter part of the month.

Commencing with 1911 considerable modifications have been made in the form of the Registrar General's Weekly Return of Births and Deaths in London and in 76 other great towns. The deaths in Greater London and in the other 76 great towns have from this date been corrected as far as practicable by excluding those of all non-residents, though including, as before, only those of residents dying in certain outlying institutions. Previously in this return scarcely any deaths of non-residents were excluded in the case of the county of London, but in the case of the other great towns those of non-residents dying in public institutions were excluded. Inclusions generally remain as before, but for the county of London and for the outer ring individually, correction is now somewhat more complete than for Greater London and the other great towns, as complete transference of deaths between the two areas is carried out. In all cases, however, correction by inclusion of deaths of residents occurring outside the area of the great towns is necessarily incomplete, and the death rates therefore tend to be understated. They will not, accordingly, correspond precisely with the annual death rates for the same areas to be published in the Annual Report, which from 1911 onwards will embody full correction. The tables showing the births and the deaths from all causes collectively and from certain individual causes, as registered in each sub-district of London and of the outer ring have been discontinued, and a new table (No. 8) showing the *corrected* deaths from all causes and from several causes in the Metropolitan Boroughs has been introduced; this new table, however, relates unavoidably to the week preceding that to which the Return refers. The list of diseases in Table 4 has been modified in accordance with the International List of Causes of Death and the sub-division of ages has been considerably extended. Minor alterations in several other tables have also been effected. In the Weekly Return of Births and Deaths in the Dublin Registration Area also the International List of Causes of Death has been adopted, and it is stated that care has been taken to ensure that the continuity of the reports will be in no way impaired.

The sixth part of the Preliminary Tables of the Census of Production [Cd–5463. Price 6*d.*] has been issued. These tables cover the production of preserved meat, poultry, and fish, pickle, sauce, and baking-powder factories, bacon-curing factories and workshops, fish-curing factories and workshops, butter, cheese, and margarine factories and workshops, clothing, handkerchief, and millinery factories and workshops, boot and shoe factories and workshops, hat, bonnet, and cap factories and workshops, glove factories and workshops, umbrella and walking-stick factories and workshops, fancy fur factories and workshops, hatters' fur factories and workshops, artificial flower and ornamental feather workshops, needle, pin, fish-hook, and button factories and workshops, and laundry and cleaning and dyeing factories and workshops. Information is also given respecting productive work carried on in the Royal Army Clothing Factory and in Army Laundries. The sections of the tables relating to the food trades complete the information obtained under the Census of Production Act with regard to these trades. It is pointed out, however, that the preparation and manufacture of food by farmers, as well as a considerable amount of food preparation and manufacture carried on by retailers were not covered by the Census. The gross output (selling value or value of work done) for private factories and workshops is 138,234,000*l.*, for the Royal Army Clothing Factory 314,907*l.*, and for Army laundries 8,534*l.*, the output for private factories and workshops being calculated on a profit basis, while that for the Royal Army Clothing Factory and the Army laundries is calculated on the cost of production. The cost of materials used is 83,007,000*l.*, 217,160*l.*, and 1,710*l.*, respectively, while the amount paid to other firms by the various private factories for work given out is 2,132,000*l.* The net output, *i.e.*, the excess of the gross output over the cost of the materials used and the work given out, is 53,095,000*l.*, 97,747*l.*, and 6,824*l.*, respectively, while the total number of persons employed (except outworkers) is 819,492, 1,553, and 120 respectively.

The fourth Abstract of Foreign Labour Statistics [Cd–5415. Price 2*s.* 1*d.*], which has just been issued by the Labour Department of the Board of Trade, contains much new material. The sections comprised in the last edition of the Abstract have been extended by the inclusion of new countries, and in some cases of additional tables relating to countries already dealt with. Thus the section dealing with hours of labour has now been expanded by the addition of a summary statement showing for all the principal industrial countries the statutory hours fixed for children, young people, women and men employed in factories and certain special industries. Tables relating to Finland and Belgium have been added to the section dealing with trade unions, which now includes information relating to 14 separate States. The section dealing with trade disputes has been enlarged by the addition of tables for Finland, Spain and Hungary, bringing the total number of countries represented up to 12. Statistics for Sweden have been added to the Conciliation and Arbitration section, which now deals with 7 countries. In the Workmen's Insurance section, figures have been added in relation to the combined system of insurance for miners in Hungary. The section dealing with co-operation has been extended by the addition of tables relating to various branches of the co-operative movement in Sweden, Spain, Bulgaria, Servia, Roumania, and Japan, so that the tables in this section now relate to 18 countries. In the new sections tables are given classifying the occupations of the people of 7 foreign countries, viz., France, Germany, Austria, Hungary, Italy, Belgium, and the United States. Tables are also given, in most cases for a series of years, relating to unemployment among trade unionists in Denmark, Norway, Germany, Belgium, France, and the States of New York and Massachusetts; the development of subsidized unemployment funds in Denmark, Germany, Belgium, France, and Switzerland; the operations of labour registries in Finland, Norway, Sweden, Denmark, Germany (with separate figures for Prussia, Bavaria, Wurtemberg and Baden), Holland, France, Switzerland, Austria, Hungary, and 8 American States; and tables are given relating to voluntary labour colonies in Germany, Switzerland, Holland, and Belgium.

In a covering letter Mr. Askwith points out that the labour involved in the compilation of this volume was considerable. Thus, Appendix I. shows that, apart from the many publications which, on examination, were found to contain no data which could usefully be tabulated, no fewer than 187 separate works (most of them of a special character) have been actually used. The greater part of the labour, however, was occasioned by the fact that the tables had in most cases to be compiled from a great mass of details, and by the necessity for a uniform presentation of the statistics selected, so far as this is possible, including their reclassification on the lines adopted in reports relating to the labour statistics of the United Kingdom. The limitations inseparable from such a compilation as this, it is added, are chiefly due to the different methods of collecting and presenting statistics which are peculiar to the various countries dealt with, and to the fact that the characteristics of a given institution are not necessarily the same in all countries. While, therefore, it is believed that the absolute value of the information presented is considerable, the warning is given that great caution should be exercised in comparing the figures for one country with those for another, and for this reason introductory memoranda have been prepared on the various sections, briefly explaining in each case the subject with which the section deals.

The Bulletin of Agricultural Statistics issued by the International Institute of Agriculture for January, 1911, is the first number of the second volume of this publication. Occasion is taken to give a short review of the first volume, which, it is observed, represents for the Bulletin "a year of study and "experience," the results of which are claimed to be satisfactory. "There is already a large group of countries who return duly filled "in every month the schedules sent out by the Institute, or who "supply the data therein requested by telegraph. The International "Institute of Agriculture has now practically illustrated its ability "to transfer, in the short space of a few days, all the replies thus "received into tabular form and to publish these in a bulletin "appearing in five languages." So far the Statistical Bureau of the Institute has limited its activities to statistics of production of wheat, rye, barley, oats, maize, rice and cotton, but it is hoped shortly to extend the service to other products and to other branches of statistics, *e.g.*, imports, exports and prices. The Institute has also succeeded in inducing several Governments, including those of Mexico, Greece and China, to establish a new service of agricultural statistics or to reorganise or modify their existing service.

The fourth report of the Central (Unemployed) Body for London, covering the period from July 1, 1909, to June 30, 1910, has been issued, and contains, among other interesting matter, a statistical survey, compiled from earlier reports, of the work of the Central Body for the past five years. The following table summarises information which has been supplied to the Local Government Board during the past four years, and compares the number of applications registered, the number of such applications which were entertained as suitable for assistance, and, finally, the number who were provided with work:—

Year.*	Number of applicants registered.	Number of applications entertained.	Number of applicants provided with work.
1906-07	28,181	13,070	3,951
'07-08	32,624	14,291	5,424
'08-09	49,239	22,414	9,021
'09-10	41,843	17,734	7,886

* April 1—March 31.

It is not possible to give strictly comparable figures of the number of applicants emigrated during the past four and a half years, as the figures relating to emigration relate to periods other than those covered by the Central Body's reports, but cover the period November 23, 1905, to June 30, 1910. During that period the total number of cases submitted to the Central Body was 7,511, and of these 3,194 (9,205 persons) were emigrated. The destination of these emigrants was as follows:—

Destination.	Number of cases.	Total number of persons.
Canada	2,635	8,077
Australia	448	746
New Zealand	111	202
Total	3,194	9,025

The total expenditure on emigration to June 30, 1910, was 75,342*l.* 13*s.*, and the amounts received from emigrants by way of repayment of promissory notes, &c., was 4,486*l.* 19*s.* 11*d.*

As regards women's work, the following table gives particulars relating to the number of cases registered at the Central Office, and the number of cases provided with work for a period of from sixteen to twenty-four weeks :—

Year.	Number of cases referred to the Central Office.	Number of women provided with work in workrooms.
1906-07	802	308
'07-08	680	359
'08-09	657	334
'09-10	740	451
Total	2,879	1,452

The average number of weeks' work per woman employed in the workrooms is 14·5, and the total cost to the Central Body of this branch of the work was 14,993*l.* to June 30, 1910. This figure is arrived at after deducting from the gross cost receipts from sales, 7,332*l.*, and values of stocks in hand, 900*l.* The average cost of each woman per week works out at 13*s.* 9½*d.*, other charges attaching to the storage and disposal of finished goods representing 4*s.* 4½*d.* per week.

The number of applicants who in 1909-10 re-applied to distress committees for assistance is shown below :—

	Number.	Percentage of those registering in 1909-10.
Applied once previously	10,560	24·8
,, twice ,, ...	5,443	12·8
,, thrice ,, ...	2,823	6·6
,, four times previously	1,809	4·2

We have received, by the courtesy of Mr. A. C. Dale, a copy of the "Act to provide for the taking of a Census throughout the "Union (of South Africa) in the year 1911, and from time to time "thereafter." The Act provides that a census shall be taken during the present year, and also in any year hereafter, on such day as the Governor-General shall appoint. The Act also empowers the Governor-General to make regulations prescribing the particulars to be furnished by the occupier of every dwelling in the Union, in respect of every living person who slept at that dwelling on the night of the census day; by every person having charge of any live stock, in respect of that live-stock; or "providing for the collection "of statistics relating to agriculture, education, religious denominations, industrial, mining, commercial, shipping and fishing "establishments and undertakings, and to friendly or building "societies or trades unions or to any society formed for lawful "objects, or to unemployment." It will be seen that the Act does not, like the Census Acts in this country, only give power for obtaining certain specific information, but, on the contrary, gives the greatest freedom in this respect. It is also a permanent Act, not an Act for one census only, and even the interval at which the census shall be repeated is not definitely prescribed.

The annual report of the United States Commissioner-General of Immigration for the fiscal year ended June 30, 1910, contains a new feature in the statistical tables. By co-operation with the Bureau of Insular Affairs of the War Department the statistics kept by that Bureau for the Philippines have been segregated during the past year in the same manner as those kept for the mainland, Hawaii and Porto Rico. It is possible, therefore, to present in connection with the various tables data regarding immigration to the Philippines. This completes the statistics covering immigration to the mainland and all the insular possessions. With regard to the main figures contained in the report, the Commissioner-General recalls his observation last year that immigration was believed to be rapidly reassuming what for a number of years had been its average proportions. That belief had been fully justified. Nor has there been any change in the upward trend of immigration, the figures for the last few months of the past fiscal year indicating that a larger influx of foreigners might reasonably be expected in the ensuing year. The total immigration for the year was 1,041,570, or 289,784 more than the total (751,786) for the fiscal year 1909, 258,700 more than the total (782,870) for the fiscal year 1908, and only 243,779 less than the total (1,285,349) for the fiscal year 1907, the "banner year" in immigration. This increase is accounted for partly by a greater demand for labour, but it is suggested that it may be due in a large measure to the activities of the transportation companies.

The first results of the thirteenth census of the United States, taken in April, 1910, have now been published in the form of a bulletin ["Population by States and Territories," Bulletin 109 of the Department of Commerce and Labour, Bureau of the Census]. The total area enumerated includes the continental United States, the territories of Alaska and Hawaii, and Porto Rico. The enumeration includes persons stationed abroad in the military and naval service of the Government, who were specially enumerated through the co-operation of the War and Navy Departments. The population of the total area of enumeration is 93,402,151, as compared with 77,256,630 in 1900. In the continental United States the population is 91,972,266, as compared with 75,994,575 in 1900; in the non-contiguous territory the population is 1,429,885, as compared with 1,262,055 in 1900. The rate of increase from 1900 to 1910 was 20·9 per cent. for the total area of enumeration, and 21 per cent. for the continental United States. These figures, however, do not cover other possessions of the United States than those mentioned. Including the population of the Philippine Islands as enumerated by the census of 1903 under the direction of the War Department, which is 7,635,426, and adding estimates for the islands of Guam and Samoa and the Canal Zone, the total population of the United States and possessions is about 101,100,000. The following table, which is for the continental United States only, gives the population as enumerated at each census from 1790 to 1910, together with the number and percentage of increase for each decade since 1790:—

Census.	Total population.	Increase since preceding census.	
		Number.	Per cent.
1910	91,972,266	15,977,691	21·0
'00	75,994,575	13,046,861	20·7
1890	62.947,714	12,791,931	25·5
'80	50,155,783	11,597,412	30·1
'70	38,558,371	7,115,050	22·6
'60	31,443,321	8,251,445	35·6
'50	23,191,876	6,122,423	35·9
'40	17,069,453	4,203,433	32·7
'30	12,866,020	3,227,567	33·5
'20	9,638,453	2,398,572	33·1
'10	7,239,881	1,931,398	36·4
'00	5,308,483	1,379,269	35·1
1790	3,929,214	—	—

The bulletin has been prepared under the supervision of Mr. William C. Hunt, chief statistician for population.

Part I, vol. xxxi, of the *Proceedings of the Royal Society of Edinburgh*, just issued, contains a paper by Mr. K. Stuart Cross, M.Sc., of the University of Melbourne, "On a numerical determination of the "relative positions of certain biological types in the evolutionary "scale, and of the relative values of various cranial measurements "and indices as criteria." In this paper Mr. Cross employs an ingenious method of weighting which is of some interest and might conceivably be applied to the weighting of index-numbers. Mr. Cross takes a series of fourteen skulls ranging from that of the anthropoid ape to that of the modern European, and tabulates the averages of some 24 measurements of these skulls. The great majority of these measurements show a continuous decrease or increase as we pass from the lowest to the highest form, and the problem is how to combine the indications given by the different measurements so as to determine the position of each type of skull in the scale of evolution. Mr. Cross commences by assigning marks to each skull for every measurement. The skull lowest in the scale is awarded zero marks, and the highest thirteen marks; the marks of those that are intermediate are determined so as to make the differences between the marks proportional to the differences between the measurements. Neglecting a slight complication due to the fact that some measurements are not available for certain skulls, the averages of the marks so awarded give the relative position of each skull to a first approximation. But it is a first approximation only, for clearly all measurements are not of equal value; if the average may be held to be a fair approximation to the truth, then the weights of those measurements which give a scale in closest accord with the average should be greater than those of the others. Mr. Cross therefore determines the coefficient of correlation between the marks given by each individual measurement and the average marks, uses these coefficients as weights, and averages again. This gives a second approximation to the position of each skull. But this necessitates a reconsideration of the weights; the coefficients of correlation are therefore recalculated, using the second approximation to the average positions; the marks are reweighted by these new coefficients, and so a third approximation is obtained. As this third approximation differs very little from the second, the process is stopped. The application to index-numbers is obvious. Suppose that we have a series of index-numbers, *e.g.*, for national progress, each determined on a different basis, and that we may legitimately regard each such index-number as an approximation to the truth, the arithmetic mean being a closer approximation to the truth. Determining the correlation between each constituent index-number and the average, and using these coefficients as weights, we get a second approximation to the truth. Reworking the correlations, and averaging again with the new values as weights, we get a third approximation, and so on.

Blackwood's Magazine for the current month contains an article on "Lamb's friend the Censustaker," by Mr. Orlo Williams. Lamb's friend, it is hardly necessary to say, was John Rickman—that "pleasant hand" so delightfully described by Lamb in a letter to Manning—who was responsible for the organisation of the first, second and third Census in this country, and may in fact fairly be called the originator of the Census. Mr. Williams gives extracts from a number of unpublished letters, which have been placed in his hands by John Rickman's grandson, the Rev. W. F. Rickman, and we gather that a selection of the correspondence is being prepared for publication. Such a publication is to be welcomed as throwing some further light on a vigorous and striking personality. One extract, from a letter to Southey in 1800, may perhaps be reproduced: "At my suggestion, they have passed an Act of Parliament for "ascertaining the population of Great Britain, and as a compliment "(of course) have proposed to me to superintend the execution of "it. Next March the returns will be made, and I shall be busy "enough for a short time, I suppose. I suspect all this attention "(it is more immediately from G. Rose) is intended as a decent "bribe; which I shall reject, by doing the business well and taking "no more remuneration than I judge exactly adequate to the "trouble. It is a task of national benefit, and I should be fanciful to "reject it because offered by rogues. As they *know* me for their "foe, I cannot suspect them of magnanimity enough to notice me "with any good intention."

It is announced that under the terms of the will of the late Sir Francis Galton, of whom an obituary notice appears on page 314 of this JOURNAL, the residuary estate is left to the University of London for the purpose of encouraging the study of national eugenics.

Mr. W. Pember Reeves has been appointed President of the Economic Science and Statistics Section for the meeting of the British Association for the Advancement of Science, which is to take place this year at Portsmouth on August 30 and following days.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Accountant, 1911—

January 7—The "Expert-Comptable" in France. Some notes on the preparation and audit of a balance-sheet: *Hamilton (W. R.)*.

January 14—Reduction in value of machinery and plant in relation to income tax assessment: *Isaacs (C. E.)*.

January 21—Some remarks on income and super-tax and its legal evasion: *Spicer (E. E.)*.

January 28—The statistical measurement of profit: *Ashley (Prof. W. J.)*.

February 4—Some compound interest problems: *Dawson (Sidney S.)*.

Accountants' Magazine, 1911—

January—The relations of local and imperial finance: *Leslie (Robert)*.

February—Fees chargeable in trust accounts.

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Part 4—Highway law as affecting property owners: *Blake (E.H.).*

Part 5—The conservation of our national water resources: *Baldwin-Wiseman (W. R.)*

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January 16, 1911—La caisse de prêts aux canuts de Lyon: *Boissieu (M. de).* Les institutions patronales aux établissements Chappée: *Lepelletier (F.).*

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LIST OF ADDITIONS TO THE LIBRARY.

During the month ended February 7, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Austria—

Labour. Erhebung über die Kinderarbeit in Österreich im Jahre 1908. Teil 1. Tabellen. 4to. 1910. (The Austrian Labour Department.)

—— Gesamtregister zur sozialen Rundschau für 1900-09. 83 pp., 8vo. 1910. (*Id.*)

—— Protokoll der 28en Sitzung des Arbeitsbeirates vom 4 und 5 Juli, 1910. 8vo. 1910. (*Id.*)

Belgium—

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Germany—

Census. Berufs- und Betriebszählung, 1907. Gewerbliche Betriebsstatistik, Abteilung 2. Heft 1. Reichsübersichten: Motoren-Arbeitsmaschinen. 4to. 1910. (The Imperial Statistical Bureau.)

Insurance. Das Jubiläum der Unfall- und der Invalidenversicherung. Bericht über die Feier herausgegeben vom Festausschuss. 8vo. 1910. (The Imperial Insurance Bureau.)

—— 25 Jahre Unfall- und Invalidenversicherung von Dr. Paul Kaufmann. Rede bei der Jubelfeier der Unfall- und Invalidenversicherung am 1 Oktober 1910. 8vo. 1910. (*Id.*)

Bavaria. Geschichte der älteren bayerischen Statistik. Heft 77 der Beiträge zur Statistik des Königreichs Bayern. 8vo. 1910. (The Statistical Bureau).

Frankfort—

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Statistische Jahresübersichten der Stadt Frankfurt am Main. Ausgabe für 1909-10. 8vo. 1910. (*Id.*)

Deutscher Verein für Versicherung-Wissenschaft zu Berlin. Entstehung und Wirken des Vereins 1900-10. Satzungen-Mitgliederliste. Inhaltsverzeichnisse der Publikationen 1900-10. 8vo. 1911. (The Association.)

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Census. Manuale pratico quinto Censimento generale della Popolazione e sul primo Censimento Industriale. 2 parts, sm. 8vo. 1910. (The "Biblioteca di Legislazione amministrativa.")

Labour. Le condizioni di lavoro nell' industria laterizia in Italia. Fol. 1910. (The Italian Labour Department.)

R. Universita di Cagliari. Studi Economico-Giuridici pubblicati per cura della Facolta di Giurisprudenza. Anno 2. 8vo. 1910. (The University.)

Roumania—

Census. Recensement Général des Lettrés et des Illettrés de Roumanie en 1909. 4to. 1910. (The Board of Agriculture and Fisheries.)

Russia—

Finance. Proposed Budget of the Empire for 1911, with Explanatory Memorandum of the Minister of Finance. Fol. 1910. (The Imperial Russian Financial Agency.)

(a) Foreign Countries—*Contd.*

Sweden—

Betänkande afgifvet af de för Uppgörande af Förslag till Lag om Understödsföreningar . . . Sm. 4to. 1910. (The University of Uppsala.)

Emigrationsutredningen. Bilaga 5. Bygdestatistik. Ekonomisk-Statistik Beskrifning öfver Sveriges olika Landsdelar af Gustav Sundbärg. 8vo. 1910. (*Id.*)

United States—

Census Bureau. Bulletin No. 109. 13th Census of the United States, 1910. Population by States and Territories. 7 pp., 4to. 1910. (The Bureau.)

American Economic Association Quarterly. American Silk Industry and the Tariff. By *Frank R. Mason*, A.M. December, 1910. 8vo. 1911. (The Association.)

Annals of American Academy of Political and Social Science. Supplement. The Need for Currency Reform. 8vo. January, 1911. (The Academy.)

(b) India and Colonies.

Union of South Africa—

Act to provide for the taking of a Census throughout the Union in the year 1911, and from time to time thereafter. 7 pp., fol. 1910. (Mr. A. C. Dale.)

(c) United Kingdom and its several Divisions.

United Kingdom—

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England and Wales—

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Bourgin (*Georges*). Statistiques Révolutionnaires. Description du Département d'Eure-et-Loir, an 11. (Extract from "Revue d'Histoire des Doctrines Economiques et Sociales.") 14 pp., 8vo. 1910. (M. Paul Geuthner.)

Brentano (*Lujo*). Die Deutschen Getreidezölle. Eine Denkschrift. Zweite neu bearbeitete Auflage. 124 pp., 4to. 1911. (J. G. Cotta'sche Buchhandlung.)

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Dean (*Arthur D.*). The Worker and the State. A study of Education for Industrial Workers in the United States. With an Introduction by Andrew S. Draper. xix + 355 pp., sm. 8vo. 1911. (Mr. T. Werner Laurie.)

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Galton (*Sir Francis*), F.R S. Memories of my Life. 2nd Edition. 339 pp., 8vo. 1908. (Purchased.)

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Keith (*Theodora*). Commercial relations of England and Scotland. 1603-1707. With a preface by W. Cunningham, D.D. xxiii + 210 pp., 8vo. 1910. (The Cambridge University Press.)

Lavergne (*L. A. de*) and *Henry* (*Paul*). Le Chômage. Causes, Conséquences Remèdes. 420 pp., 8vo. 1910. (Messrs. Marcel Rivière and Co.)

Mayr (*Dr. Georg von*). Begriff und Gliederung der Staatswissenschaften. Zur Einführung in deren Studium. Dritte umgearbeitete und vermehrte Auflage. viii + 182 pp., 8vo. 1910. (The Author)

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Schott (*S.*). Alles Ding währt seine Zeit. Feriengedanken eines Statistikers. 27 pp., 8vo. 1911. (The Author.)

Smith (*Charles William*). A Manifesto (No. 3) on the World's International Financial and Commercial Gambling Systems. Labour *versus* Capital: the coming Revolution. The World's only Salvation. 28 pp., sm. 4to. 1911. (Messrs. P. S. King and Son.)

Touzet (*André*). Emplois industriels des Métaux Précieux. Études économique et juridique. 696 pp., 8vo. 1911. (Messrs. Giard and E. Brière.)

Viviani (*Réné*). Les Retraites Ouvrières et Paysannes. Discussion de la Loi au Sénat et à la Chambre des Députés. xxvii + 564 pp., sm. 8vo. 1910. (*Id.*)

Webb (*Herbert Laws*). The Development of the Telephone in Europe. With an Introduction by Harold Cox. 78 pp., 8vo. 1911. (The Author.)

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(e) **Societies, &c., British.**

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Vol. LXXIV.] [Part IV.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

MARCH, 1911.

The FATALITY *of* FRACTURES *of the* LOWER EXTREMITY *and of* LOBAR PNEUMONIA. *A* STUDY *of* HOSPITAL MORTALITY RATES, 1751-1901.

By M. GREENWOOD, JUN., *Statistician to the Lister Institute of Preventive Medicine and Director of the London Hospital Statistical Department, and* R. H. CANDY, *Late Assistant in the London Hospital Statistical Department.*

(From the Statistical Departments of the London Hospital and the Lister Institute of Preventive Medicine.)

[Read before the Royal Statistical Society, February 21, 1911, the President, the Right Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.]

I. *Introduction.*

A CIRCUMSTANCE which must have impressed itself upon many sociologists is the fact that our statistical history of disease is very imperfect. We have indeed, thanks to the labours of many distinguished epidemiologists and statisticians, much knowledge of the prevalence and types of infectious disease in the near and remote past, while Hirsch and others have shed light on geographical pathology. When, however, we turn to those common diseases and injuries which have always been observed to occur and will doubtless continue to recur in every age, our knowledge is seen to be extremely incomplete. For instance, we all know that the hospital treatment of fractures is now far superior to what could be obtained in the eighteenth century, but no continuous statistical record of the change has yet been published. Again, lobar pneumonia has been recognised as a clinical entity for many years; how has its case mortality varied? What is the relation between case mortality and age, sex or social rank? Such questions as these have, or may have, something more than an historical interest, since their solution might point to the importance of factors hitherto unsuspected in the course and termination of certain diseases. Even were this not to prove the case, the value of such inquiries, when prosecuted in the spirit of exact science, must be considerable to him who wishes to study the hygienic progress of our country.

It is the object of these investigations, the first of which is now published, to provide comparable data obtained from one section of the community, viz., "The General Hospital Population" as observed in the London Hospital, and before detailing the results of our inquiry it is essential to consider some main peculiarities of this stringently selected class.

Two forms of selection have great influence in determining the characteristics of a "General Hospital Population." In the first place, there is an economic selection, large groups of the nation not being represented at all; in the second, there is a pathological selection, some forms of disease being over- and others under-represented from the standpoint of the actually observed prevalence of diseases in the community at large.

With respect to the first point, the following statements will, we think, be found to be substantially correct. The majority of hospital patients belong to the working class, but in the case of surgical in-patients a relatively greater admixture of members of the middle class exists than among the medical patients, owing to the increased expense of modern surgical treatment. From the point of view of our present inquiry, it is material to know whether the social position of the patients now treated differs much from that of the eighteenth century inmates. This is a question which we cannot answer exhaustively, but we are disposed to reply in the negative. In 1783, for instance, 21·6 per cent. of the total male patients in the London Hospital (1,139) were entered as "labourers," and 23·4 per cent. of the surgical patients (555) were so described. Taking the first 1,369 male patients on the surgical side in 1907, 17·5 per cent. were found to be entered as "labourers." Remembering that the word "labourer" when used without qualification now denotes only the least skilled and worst paid type of manual worker, the improvement suggested by these figures may well have been slight. Indeed it may be said that not only are the bulk of hospital patients taken from the working class, but from among the less prosperous members of that class. The existence of so high a percentage of labourers is perhaps evidence of this, but, in addition, anyone acquainted with hospitals will endorse the evidence, given before the recent Royal Commission on the Poor Laws by an experienced hospital administrator, to the effect that the line dividing the class of legal poor from that of the general hospital community is by no means distinct.

With respect to the second form of selection enumerated above, our knowledge is more definite. At the present time chronic diseases, unless their rarity makes them of special interest, are not admitted to the hospital at all freely. This selection has been practised with ever increasing stringency as the demands on hospital space on the one hand and the municipal provision for the sick poor on the other have grown. Indeed these facts have led in certain quarters to the conclusion that hospitals are not entirely satisfactory instruments for the training of the general medical practitioner. In the days before the creation of efficient parochial infirmaries such selection was less rigid, as is clear from a quite cursory examination of the eighteenth century records. There is actually some little reason to think that a precisely opposite rule was for a time followed. In this way only can we account for the high percentage of cases entered as "rheumatism" between 1750 and 1800, cases which appear seldom to have had a fatal issue, while acute pneumonia or true "peripneumony" is hardly represented at all before 1780. A plausible explanation is that in the early days of hospitals popular belief in the efficacy of institutional treatment in acute diseases was but small. There were also definite prohibitions: venereal diseases were excluded for several years. "In 1756, a list " of diseases was put up, and patients suffering from these were not " to be admitted. The 'prohibition list' included 'ulcerated cases,' " women with child, children under 7 (except for amputation or " 'cutting for stone'), patients suffering from fits, small-pox cases, " cases of itch, distempers, consumptives, asthmatical cases, in- " fectious cases and all 'disordered in their senses.'"[1]

It may be inferred from these facts that any comparison of death-rates using a broad classification must be hopelessly misleading, and that care must be exercised in choosing materials for comparative study. These facts are further supported by a description of the records available for comparison to which we now turn.

The elaborate system of clinical notes common to the "London" and other medical schools, only extends back in our case through some thirty years. Before that time the physicians compiled case books, certain volumes of which are in existence and refer to so early a period as the third decade of the last century. These volumes are, however, of no service to the statistician since they describe but a comparatively small percentage of the total patients, the writers having naturally preferred to dwell upon cases of peculiar professional interest. The only continuous record of hospital practice is the series of admission books; these extend from 1751 down to the present time, with the exception of a period of some fifteen years at the beginning of the nineteenth century and an odd year or two more recently. These volumes record the name, age (except for the first eight or nine years), sex, occupation and disease of every patient admitted to the hospital, the length of stay in the wards and the result of treatment, whether "cured," "dead" or "relieved." With the advance of medical knowledge, the diagnosis has become more precise, but no material change has been made in the form of the entries down to the present time; we are thus in possession of an almost continuous record of nearly a century and a half's hospital experience.

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[1] *A history of the London Hospital*, p. 109, by E. W. Morris. London, 1910.

For the medical antiquary these books, with their frequent entries of diseases either extinct or no longer endemic in the east of London (*e.g.*, various agues) and their variations in nomenclature, contain much of peculiar interest. For our statistical object it is more to the point to consider what weight should be assigned to the diagnoses for comparative purposes, and how we can grapple with the selective difficulties already mentioned.

Clearly we must choose some disease or injury which (1) is common, (2) is always likely to be admitted to the hospital when it presents itself, (3) does not offer unusual difficulties in diagnosis. Quite apart from the question of selective rules, it is certain that many of the early records are of no value to us. Under the simple rubric "fever" are, for instance, a large number of entries which in all probability refer to quite disparate conditions. Indeed a considerable proportion of the diagnoses are evidently symptomatic. Even if there had been no selection, we should have been compelled to fall back upon a small field for choice. For these reasons it appeared to us that the most suitable material would be fractures of the lower extremity as an example of injury, and lobar pneumonia as a type of disease. Both these groups conform to the three conditions enumerated above, and, in addition, it may be said that the case mortality or, to use a better term, the fatality of both is appreciable even in modern times. It seemed to us that a study of this material ought to throw light on such changes as have occurred in the general conditions of hospital treatment as well as in the resistance to injury and disease of the hospital type of patient, *in so far as these can be measured by death-rates.* The first part of this paper will be devoted to a study of the statistics of (1) simple fractures of the leg, (2) simple fractures of the thigh, (3) compound fractures of the leg. Since, however, these statistics are chiefly of historical interest and do not, for reasons which will be explained later, admit of detailed analysis, we shall deal with them as briefly as possible, passing on to the second part of our work which consists of a study of the case mortality (fatality) of acute lobar pneumonia as modified by age, sex and class. This part of our inquiry is, we hope, of some little interest, since not only does our material comprise upwards of 5,000 cases, covering more than fifty years' experience, but in addition many series compiled by other writers are available for comparison with and confirmation of our results.

A. *Simple fractures of the leg.*

Table I contains the London Hospital figures from 1751-1901, grouped in decennial periods, the mean age, standard deviation and coefficient of variation being given in each case. Diagram 1 gives the fatality in the form of a graph, the separate figures for males and females from 1843 are given in Tables II and III, while separate male and female graphs from 1831 are shown in Diagram 1. It

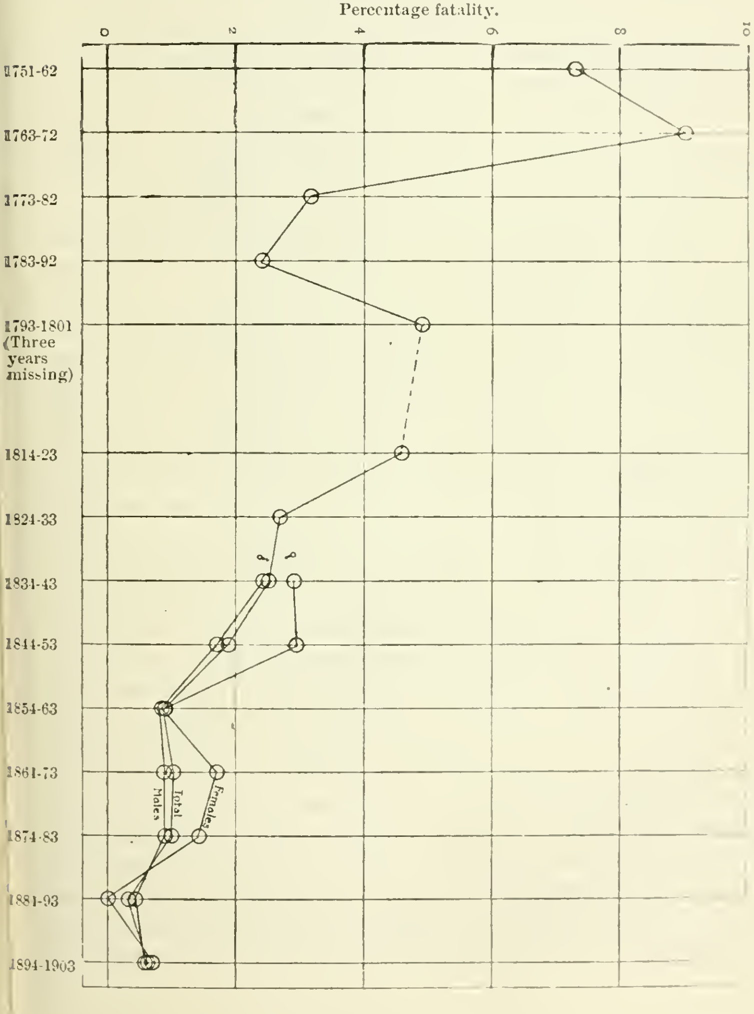

DIAGRAM 1.—*Percentage case mortality. Simple fractures of the leg.* London Hospital. In-patients. Grouped in decennial periods, 1751-1903.

should be remarked that from 1854 onwards we have not extracted the whole of the figures for each decennium, owing to the excessive labour involved; we have started with the central years of the decennium, and worked backwards and forwards. Thus the figures given for 1864-73 are based on the years 1866, 1867, 1868, 1869, 1870, and 1871. The actual omissions are shown in brackets on Table I; for the last three decennia the middle four years in each case were used. Of course, for fractures of the thigh and the other subjects considered in this paper, all the data were extracted.

Fixing our attention first on the general figures, without regard to sex, it will be seen that the fatality diminished rapidly and tolerably steadily to the decennium 1854-63; since that period it has exhibited no regular change. Two factors necessarily influence the case mortality, viz., age and sex. With regard to sex, it is clear from Tables II and III that a decided difference exists in favour of males, a difference which is still more considerable in the case of fractures of the thigh, and will be mentioned again in the next section. At present it is sufficient to remark that, in the earlier years of the hospital, female patients were not, we think, relatively more numerous than at present, so that the general diminution in fatality cannot be attributed to a change in the sex ratio. With regard to age constitution, it will be noticed that the mean age of the patients has tended to fall and, since increasing years must generally be unfavourable to a person's chance of recovery from accident, this fact may have had some influence on the fatality rate. In order to estimate the probable importance of this, we have determined, by Pearson's new method,[2] the correlation between age and liability to death after fracture. Table IV shows the groups used and the results; the probable error has been assumed to be three times that of the coefficient as determined by the product moment method in the case of normal correlation. All the values indicate an appreciable relationship, but the change in rate of fatality can hardly be attributed to this cause. Table IVA is an attempt to eliminate the age influence by the method of standard population. The mortality coefficient for each age-group (the first group was 1—5 years, the second 6—15, thence in groups of ten years) was determined for each set of data appearing in the table, then the number of deaths per 1,000 which would have occurred in a population having the age-constitution of the data for 1884-1903. It will be seen that taking a period of some thirty years as the unit instead of a decennium makes the fall smoother. At the same time, such a table as this must not have too much weight attached to it. The fatality rates are subject to large random errors, especially in the later years when the total numbers of deaths are small. It seems, however, tolerably clear that the change in fatality is a real phenomenon, not due to incomparability of the records.

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[2] *Biometrika*, vii, 96.

Changes in the rate of mortality do not, of course, completely represent the improvements which may have been effected in hospital treatment. There is, indeed, reason to think that the percentage of serviceable limbs which follow the healing of a fracture is higher in modern times; we have not, unfortunately, any statistical evidence bearing on the matter, our data only being concerned with deaths. We do not know how many of the patients returned as "cured" in the old times actually left the hospital lame for life.

A source of error which has probably occurred to the reader may be mentioned at this point. The majority of the fractures recorded in our series are the result of direct or indirect violence; in many cases they are the results of street accidents; in others of falls from the rigging of ships, and so on. Now it might well happen that a person admitted to the hospital with a broken leg, as the only objective sign of injury, was in reality suffering from "shock," or perhaps some grave internal lesion. Supposing death to follow in such a case it would not be in any real sense a result of the broken leg, and the frequency of such deaths would throw no light upon changes in hospital treatment; the inclusions of these cases would indeed be a serious source of error in our investigations. To minimise this we have omitted all cases in which death took place within three days of admission to the wards. This plan, of course, reduces the total mortality, but we feel confident some such method must be adopted, and have followed the same course in the case of compound fractures of the leg and simple fractures of the thigh. Even by this process we cannot have excluded the whole of the instances in which death was not really due to the fracture as a primary cause: for instance, a few undetected cases of sarcoma and some of shock or internal injury which survived longer than three days. In view of the large numbers involved it is to be hoped that such sources of error are not of importance.[3] An unavoidable source of error is mistake in diagnosis; perhaps in this particular case the number of such errors is not very large.

One further point of interest in connection with simple fractures of the leg has been examined. In the later years the fractures are classified in accordance with whether one or both bones were broken, and it seemed to us that the age distributions were markedly different in the cases of separate bones; tabulation proved this to be the fact, as will be seen in Table V. For the purposes of this comparison no cases of Pott's fracture[4] were included. We thought it might be of interest to fit a frequency curve to the cases of fractured fibula; Table VI contains the results, from which it will be seen that a good fit was not obtained. We are unable to say whether this is due to heterogeneity of the material or inaccuracy of the age records. It is not very easy to say why this marked difference in mean age should be found; had we included Pott's fracture the cause would have been plain, since the form of accident which generally produces this kind of injury is more likely to occur in later life. As it is, however, we can only refer the distinction to the fact that the superior elasticity of youthful bones would perhaps be a greater safeguard to the fibula, a slender rod fixed at the extremities and bearing little direct weight, than to the massive tibia.

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[3] It is also to be noted that the case mortality rates in the later years depend on small absolute numbers of deaths, and are subject to large random errors.

Finally, we determined whether the age distribution for all fractures of the leg was markedly different from that of the population at large. To ascertain this, we extracted the data for the population at ages from the census of 1901, Metropolitan Borough of Stepney, which includes the district in which the accidents likely to be treated in the London Hospital would occur. We then tabulated the actual ages of the patients admitted with fractures in 1897–1900, together with the probable age distribution of the same number of cases on the ground of the census figures (Table VII); as was to be expected, the actual figures show an immensely greater incidence of fractures upon adults and a less incidence upon children than calculated on the basis of a random distribution.

The general conclusions which may be drawn from this analysis are, we think, the following:—

(1) The fatality of fractures diminished very greatly and fairly steadily during the first century of the hospital's experience.

(2) In the last fifty years the rate of fatality has not fallen regularly and has possibly reached the irreducible minimum.

(3) There is a slight sexual difference in fatality.

(4) The mean age of fractures of the tibia is appreciably lower than the mean age of fractures of the fibula.

(5) The maximum frequency occurs between the 35th and 55th years in males.

B. *Fractures of the thigh.*

These fractures have been tabulated in the same way as those examined in the last section except that all the data have been entered, even for the later years (Tables VIII—X). An examination of Table VIII fails to reveal any continuous change, the figures being most irregular. Tables VIII and IX show a striking difference between male and female rates of fatality, but this cannot be altogether sexual since the mean age of the female cases is much higher than that of the male patients and the correlation between age and liability to death (Table XI) is appreciable. We publish this set of tables for the sake of completeness and to avoid the imputation of having condemned data without giving other workers the opportunity of forming an independent judgment. In our opinion, their irregularity is so great that no sound argument can be based upon them with regard to changes in fatality. It is perhaps safe to say that they afford some evidence of a higher rate of case mortality among female patients, so far confirming the results of Section A, but beyond this we cannot go. It should be remembered that fracture of the thigh is a considerably more serious injury than fracture of the leg bones, when produced in adults.

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[4] A fracture of the lower end of the fibula, generally due to indirect violence, as in slipping over the kerb.

C. *Compound fractures of the leg.*

Since, by definition, a compound fracture supposes the existence of an open wound, it was to be expected that our returns would show a diminution in mortality, an improvement becoming more marked as we approached the present time; Table XII bears out this expectation, so far as it goes. The grouping is not for equal intervals of time, but so chosen as to give comparably large numbers. Here again, we are unable to attach very much importance to the results, owing to numerous sources of error. In the first place, the numbers are too small to allow of separating males from females; in the second, the injuries covered by the term "compound fracture" are extremely diverse in severity; in the last, amputation in very serious cases is much more likely to have been resorted to in modern times than in pre-anaesthetic days, and these cases do not figure in our returns. Nevertheless, even allowing for all these sources of error, it is not unfair to conclude that a considerable saving of life has been brought about.

On the whole, the reader will probably think that the positive additions to our knowledge which have resulted from this analysis of accident fatality are neither many nor important. It was, however, necessary to examine and analyse the data, since only by doing so could we arrive at an opinion as to their value, and perhaps save other statisticians a somewhat fruitless task.

PART II.—*The statistics of lobar pneumonia.*

In obtaining data for this part of our inquiry we have extracted cases in which the substantive disease was recorded as pneumonia, lobar pneumonia, or croupous pneumonia; all cases described as broncho-pneumonia, and any cases in which owing to ambiguity of description or other circumstance it could be fairly inferred that the disease really might be broncho-pneumonia, were rejected. Since pneumonia may occur as a complication of other morbid states, for instance, the so-called terminal pneumonias, these data do not include all cases which have been actually treated in the wards; they do, however, include all cases in which pneumonia was the principal disease. Our chief source of difficulty has been cases simply recorded as pneumonia; doubtless some of these were really instances of broncho-pneumonia, and should not have been included in our figures. This source of error was especially felt in dealing with the early years of the hospital, and with records of children. This probably explains the great irregularities to be noticed in our age groups 0—5 and 0—10 years, as well as those to be seen in the figures from other hospitals.

The crude results of our work are given in Table XIII. It will be seen that the total numbers of cases up to 1854 are so small that little weight can be assigned to them, and in what follows our attention will be mainly concentrated on the returns from 1854 onwards. Our first question is, whether the fatality has changed so markedly within the period under review that the data ought not to be treated as a whole. Table XIV contains the results of an inquiry directed to this point. If the entries in this table are compared with their probable errors, the conclusion at which one arrives is that, although on the basis of the numbers recorded it would not be safe absolutely to deny the possibility of some change having occurred, yet, except in age group 1—5 years, no marked alteration can be demonstrated. But, as we have just remarked, these early ages are precisely the ones for which our data are least trustworthy. Hence we are unlikely to commit a serious mistake in examining the data as a whole, as is done in Table XV.

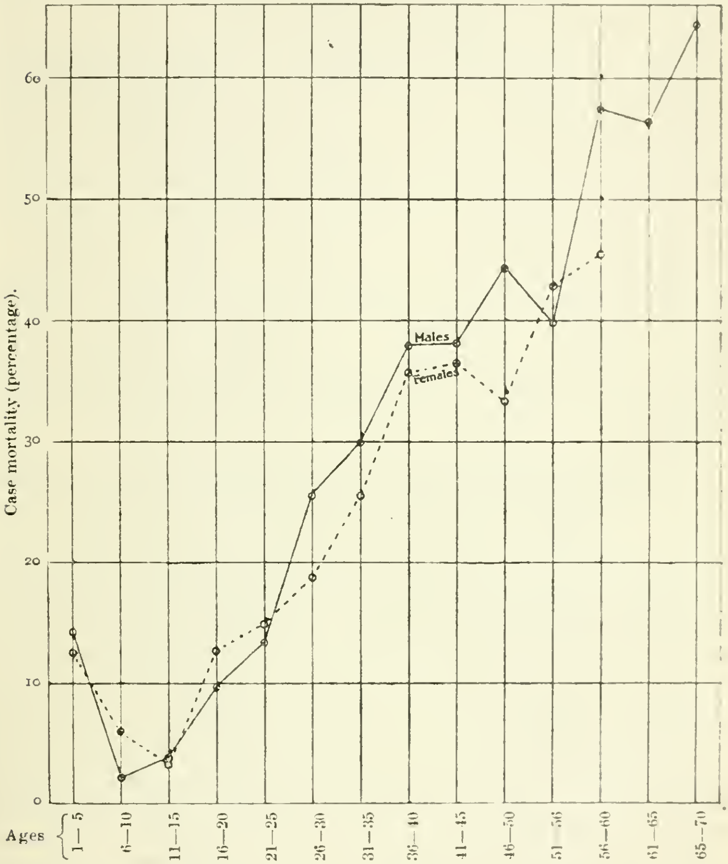
Noteworthy features of this table are (1) the high fatality in the first age group, (2) the very low fatality for ages 6—15, (3) the rapid rise after the twenty-sixth year (see Graph 2). The probable errors of the percentages as determined by the usual method are given in the table; the process is, however, not really valid when the percentage of the character falls much below 10 per cent. In such cases the distribution of random samples is not effectively given by the normal curve.[5] One of us hopes to discuss this question at length on another occasion, since the matter is of importance in some classes of medical inquiries, but the problem need not detain us at present.

[5] Pearson, *Biometrika*, v, 172.

There is, however, another objection to the conventional method of determining the probable error when applied to data such as these which deserves serious notice. The process of deducing the standard deviation of the ordinary binomial can only be regarded as a valid test of dispersion when the chances of the events happening are strictly independent. It is assumed that in a population of n individuals p of whom possess a certain character, the chance of any individual presenting the character is p/n. Even when the events are independent, the dispersion is not always the same; an elementary illustration being the difference between the dispersions obtained on the basis of Bernoulli's scheme and the more general

DIAGRAM 2.—*Case fatality of pneumonia (lobar).*

London Hospital, 1854-1903. Total number of cases: males, 3,791; females, 1,306.



case of Poisson.[6] But if we reach a case in which the chances are not independent, the difficulty becomes much greater. If in a population of n, p suffer from an infectious disease, it cannot be said that the chance of any one person catching the disease is absolutely independent of the chance of any other person taking it. In such a case it seems absolutely necessary to deduce a new expression for the frequency of random samples. One of us has devoted some little attention to this problem, and hopes to communicate a few theoretical results later. We do not think the problem, as a question of algebra, offers any insuperable difficulties, indeed, such difficulties as have so far been encountered would probably give little trouble to a more expert analyst. The crux seems rather to be as to the objective assumptions to be made. We must suppose that the population presents various degrees of susceptibility; further, we have to consider whether the infective organism progressively changes in virulence throughout the epidemic. On both these points some statistical work has been done. We may refer to the papers of Brownlee on the course of epidemics, and to Yule's discussion of a cognate, but not identical, problem[7] in the Journal of this Society. The immediate point is, how far do these considerations invalidate the probable error test as applied to our material?

It is to be remarked that we are not dealing with the number of cases of pneumonia occurring in the population, but with the number of deaths among pneumonia patients. The difficulty of infection does not arise, since the whole "population" is infected; we might, however, suppose that the deaths are not independent, since a group of deaths might be caused by the patients all having been infected by a specially virulent strain of pneumococcus, or having all been subject to the influence of unfavourable weather conditions. There can be little doubt that climatic conditions markedly affect the prevalence of pneumonia; whether they also change the case mortality is, perhaps, not quite so certain, but still likely enough. It is also highly probable that variations in the virulence of the infective organism or its toxins occur. These considerations weaken the value of the test, but some mitigating circumstances should be noted. In our records a period of ten years is the unit of time, and the patients are drawn from a fairly wide area. Perhaps the hypothesis that the causes of the individual events are independent is not entirely misleading in such a case.

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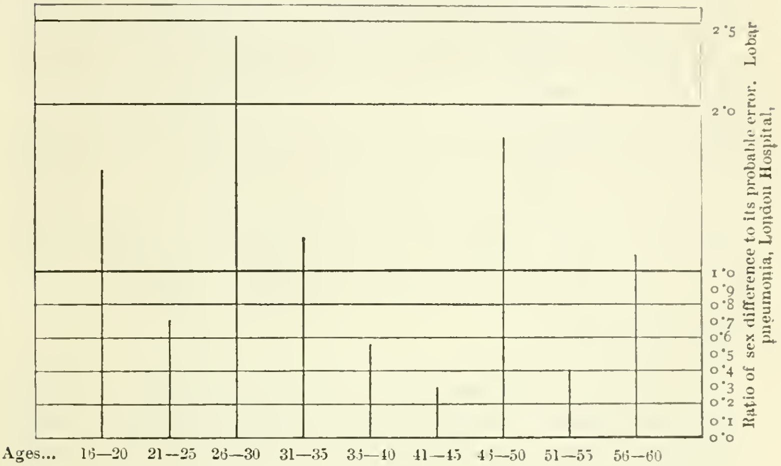
[6] For a good discussion of this, see Czuber, *Wahrscheinlichkeitsrechnung* (1903 edition), pp. 128—130.

[7] Brownlee, *Proc. Roy. Soc. Med.*, May, 1909. Yule, *Journal of the Royal Statistical Society*, lxxiii, 26.

On the whole, but with considerable hesitation, we have decided to publish the probable errors based on the ordinary calculation; we frankly recognise, however, that their interpretation is a matter of serious doubt.

The next question that arises is with regard to the difference in fatality rates of males and females. Table XVI and Diagram 3

DIAGRAM 3.



give the necessary information on this point. The general trend of the figures rather suggests that women are somewhat more likely to be victims in early life and slightly less subject in later life than males; but an examination of the probable errors (bearing in mind the caution just given) hardly inclines one to believe that there is a real sexual difference. It would appear that sex is not a very important element in prognosis. We may remark that the actual incidence of pneumonia is said to be much heavier upon males than upon females, but we have no data which enable us to examine the problem. It is perfectly true that both our own and almost every other collection of hospital statistics show a higher proportion of male cases, but this need not be due to a greater incidence of the disease. We must remember that lobar pneumonia is an acute disease, the stress of the illness falling upon a comparatively short period. We believe it to be a fact that women of the poorer classes are specially reluctant to leave their home and children when ill, since during the period of convalescence they can still exercise some supervision over household affairs. They are more likely to remain at home if this be possible than are their husbands, who, if confined to bed, even when convalescent, can be of little use in keeping house or looking after the children.

We next have to consider how the London Hospital experience compares with that of other general hospitals, and Table XVII[8] summarises the published experience of several other institutions. The data from St. Bartholomew's Hospital appear to suggest an unusually low rate of fatality, but the numbers are rather small, and the general impression one derives from the whole of the data is that our Table XV represents quite accurately the rate of fatality in the general hospital class of patient. It is interesting to note that the data from the Johns Hopkins Hospital are derived from a population racially different from that of the other institutions; the numbers under review in this case are too sparse to permit of very definite conclusions being drawn, but, so far as they go, there seems little reason to expect a racial difference in fatality rate. In view of the fact that our material is tolerably extensive, the statistician will naturally inquire whether we have attempted to graduate the fatality percentages by any formula allowing of interpolation; this is an interesting question, which we have approached in the following way:—

The fatality of the group up to 5 years is so variable (see, *e.g.*, Table XIV), and the impression that lobar pneumonia is not a very fatal disease in young children so general among experienced clinicians, that we suspect strongly that the data for this age group are subject to a large empirical error. It is indeed well known that the differential diagnosis of lobar pneumonia in young children is not an easy matter,[9] so that we are fairly confident but little reliance ought to be placed upon these figures. We therefore confined our attention to the remainder of the experience, and attempted to graduate it. Two methods suggested themselves; the first was to fit a straight line by the method of least squares, or, what comes to the same thing, and is slightly quicker, to determine the regression line of percentage fatality upon age, weighting, of course, with the number of observations in each age class. The second was to consider the percentages as ultimate facts, and to fit a frequency curve to them by moments.

Obviously the second plan, which neglects the fact that the percentages at the end of the experience are subject to large probable errors, owing to their being based on a small absolute number of instances, can give nothing but an interpolation formula having no general validity; we thought, however, the comparison of the results might be of statistical interest. Table XVIII contains the results obtained by both processes. The straight line was determined by least squares, and also, as a check on the arithmetic, from the regression equation; portions of the straight line and curve are shown in Diagram 4. Since the constants of the straight line were obtained by using weighted points it was to be expected that the skew curve, fitted to the percentages themselves, regarded as actual frequencies, would follow the latter more closely, especially towards the end of the experience. Such is the case, but the curve so fitted, viz., on a purely arbitrary assumption, is not so far superior in its power of reproducing the trend of the observations to the straight

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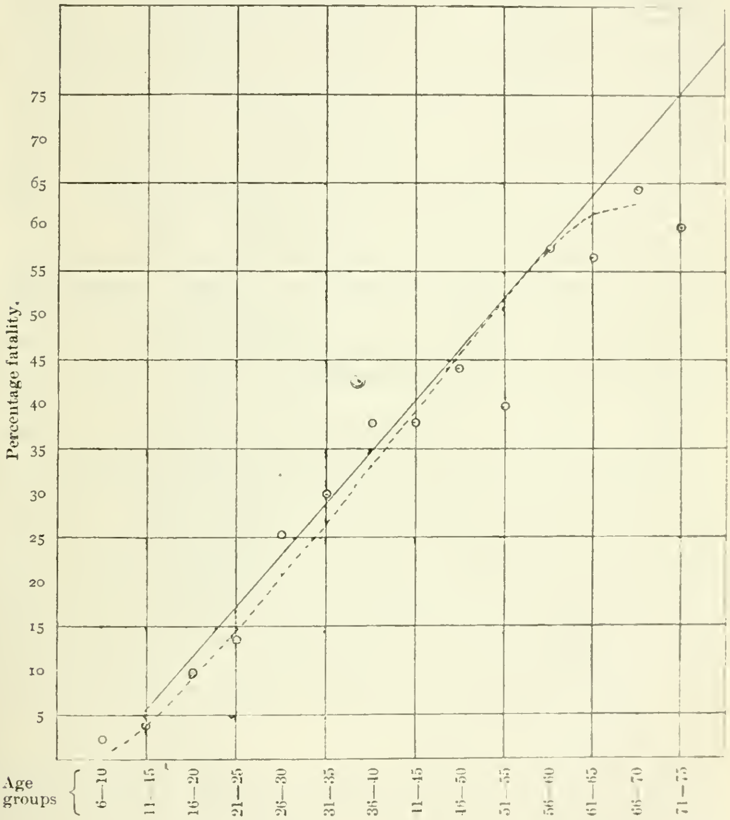
[8] Hadden, Mackenzie and Ord's data are from *St. Thomas' Hospital Reports*, 1889, Sturges and Coupland's from the 2nd edition of their work on Pneumonia, other sources appear in the table.

[9] *The natural history and relations of pneumonia*, by O. Sturges and S. Coupland. 2nd Edition. London, 1890, see esp. pp. 135—144.

DIAGRAM 4.—*Relation of age to mean fatality.*

London Hospital. Male pneumonia cases.



line that it can be regarded as preferable even as an interpolation formula. When we remember the undoubted fact that the ages as given in our records are almost certainly subject to a considerable observational error, owing to ignorance or carelessness on the part of the patients, we may say that the results of our analysis suggest that, so far as mere curve fitting is concerned, fatality may quite possibly be a linear function of age. It is, of course, not improbable that a weighted parabola would represent the observations still better, but in view of the imperfections of the data just mentioned, it seems that the straight line is a close enough representation of the data, and might be used for purposes of interpolation with sufficient accuracy. Naturally such a line could not be used to extrapolate fatality rates outside the range of our observations; indeed it is well known that even with data much surpassing ours in extent and accuracy extrapolation is a dangerous process.[10] It is worth notice that the true nature of the relation between age and *severity* cannot be completely determined in this way. Our scale of severity is only the percentage of fatal cases upon total cases at each age; we have no means of determining the real variability of the whole population The whole value of the determination of r in such a case depends on the closeness or otherwise with which the regression line fits the observations. Without some measure of severity other than percentage deaths it hardly seems possible to use a better graphic method.[11]

Lastly, we have compared the age constitution of the experience for 1899–1903, male cases, with that of the census population of the borough of Stepney, just as was done for fractures. As will be seen, there is some evidence that the greatest incidence tends to come upon the group 15—19, but there is nothing like the discrepancy observed in the case of fractures. This result is in accordance with one's expectation, since we should anticipate that the cases would tend to be evenly distributed on the whole with the exception of some increase in the years of early manhood when exposure to outdoor conditions might tend to lower the resistance of the organism towards the infective agent.

The results so far considered seem to justify the following statements: (1) The fatality of pneumonia in the hospital class of patients has not appreciably changed in the last fifty years; (2) there is no evidence of a sexual difference in fatality rate; (3) the increase of percentage fatality with age can be *roughly* represented by a straight line. The next question, and that one of much interest, is—how does hospital experience compare with that derived from private practice among other classes of the population? Is pneumonia distinctly more fatal among the poorest classes of the community than in general?

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[10] Perrin, *Biometrika*, iii, 99.

[11] For a good discussion of scales of severity see Brownlee, *Biometrika*, vi, p. 313.

Material for studying this question is not readily obtained. Indeed we know of only one published series of English cases at all comparable in respect of numbers with those just considered. These are the results of an inquiry by the Collective Investigation Committee of the British Medical Association, carried out some twenty-five years ago. The statistics of this inquiry as arranged by Sturges and Coupland[12] are given in Table XX. In the face of the comparatively small total numbers and the apparent differences between the male and female rates, it is difficult to express an opinion; we would merely remark that such figures would not, taken alone, permit one to assert that the fatality in non-hospital patients is markedly different from that shown by the hospital records; fortunately a much longer series of cases has been recently published. This material is derived from the experience of the Leipzig Krankenkasse;[13] we reproduce in Table XX the data for male obligatory members of this Krankenkasse, the experience covering a period of some ten years from 1887. The cases included are all those not diagnosed as broncho-pneumonia and may possibly comprise a few examples of the latter together with, as the editors of the official statistics suspect, some cases of tuberculous disease. It is doubtful, however, whether the data are markedly less accurate from the diagnostic standpoint than our own and, with respect to age records, it is very probable that they are more accurate than hospital figures. Since the termini of the quinquennia are not the same as were adopted in our original grouping of the London Hospital figures, the latter have been re-grouped to allow of direct comparison, and are repeated in Table XXI, which also shows the differences in rates of fatality together with their probable errors for some of the more populous groups. It will be seen that there is a literally enormous difference; in practically all the age groups the German fatality rate is little more than half that of the London Hospital patients. The question at once arose as to whether the distribution of fatality and its relation to age was materially different in this case. Table XXI and Diagram 5 show the results of a graduation. As before a weighted straight line fairly represents the data and is not markedly inferior in fit to a skew curve arrived at on the basis of the arbitrary assumption already mentioned. The change in rate of fatality with increasing age seems to follow a course similar to that observed among the London Hospital patients although the absolute values are different.

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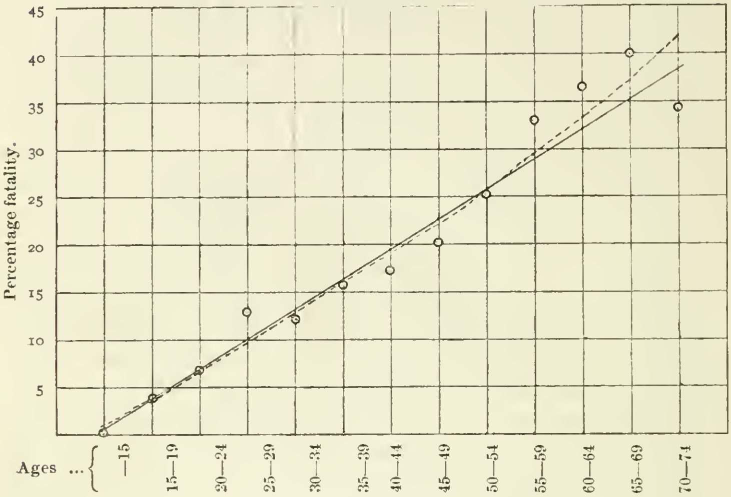
[12] *C.I.C. Reports*, Vol. II, p. 102. See also Sturges and Coupland, *op. cit.*

[13] *Krankheits u. Sterblichkeitsverhältnisse i. d. Ortskrankenkasse f. Leipzig u. Umgegend.* 4 Vols. Berlin, 1910.

DIAGRAM 5.—*Relation of age to mean fatality.*

Pneumonia. German males. Leipzig data.



We must next ask ourselves whether this great difference is due to racial or climatic elements, since there is some ground for thinking that both of these factors have some importance in the prognosis of the disease. The matter could at once be decided by reference to the statistics of a large hospital in Leipzig, but we have unfortunately not been able to find any long series of such data relating to modern times from any Continental hospital; the only data at all comparable in point of numbers which we have discovered refer to a period more than forty years ago. Fismer gives the following records for the Basel hospital:—[14]

Years.	Number of cases of pneumonia.	Deaths.	Percentage fatality.
1839–48	223	55	24·7
'49–57	197	49	24·9
'58 66	232	60	25·9
'67–71	270	49	18·0

The author attributes the diminution in the last period to the adoption of a different form of treatment, but as we cannot compare the age constitutions for the earlier periods with those of the later years, it is difficult to regard the inference as certain. On the whole, we may say that these figures do not differ materially from those of the London Hospital. In 1861 a German translation of Huss's monograph, dealing with the experience of the Seraphim Hospital at Stockholm, was published.[15] The statistical portion of this work is, in our opinion, admirably carried out, and we have collected the figures in Tables XXIII and XXIV. Although we have not been able to tabulate the information in a manner accurately comparable with the London Hospital and Leipzig data, still it is clear that the rate of fatality is much lower than that of the London Hospital, and compares not unfavourably with that of the Leipzig Krankenkasse. Were we able to suppose that the experience of German hospitals is similar, then the difference between the London and Leipzig returns would have to be attributed to racial and climatic peculiarities. Huss, however, states that between 1847 and 1857 there were 5,990 cases of pneumonia in the general hospital of Vienna, with 1,441 deaths, or a fatality of 24·13 per cent. The authority for this statement, a report issued from the Viennese hospital in 1857, is not accessible to us, but Huss is unable to suggest any satisfactory explanation of the difference. Had there been any gross fallacy in the comparison, *e.g.*, a marked difference in age constitution, we feel sure so careful a writer would have mentioned it. It would appear, therefore, that we cannot definitely say whether the hospital fatality rate in such a city as Leipzig is or is not lower than in London. If we attribute the difference between the figures from Vienna and Basel on the one hand, and Stockholm on the other, to climate, then we should probably have to say that Leipzig ought to be approximated rather to Basel and Vienna than to Stockholm. It should also be remarked that the stress of industrial conditions—the whole group of circumstances which go to make up life in a great city—render Leipzig, Vienna, and London more homogeneous from this standpoint than would be the case if we included Stockholm. We conclude, but with much hesitation, that the evidence before us is not sufficient to allow of our saying that the difference between the Leipzig and London rates should be referred to climatic or racial factors; that they cannot be due to any sudden increase in morbidity as a consequence of some local epidemic[16] is rendered probable by the length of time under review; it seems necessary to resort to some other hypothesis. A possible cause of the discrepancy is found in the suggestion that only severe cases apply for hospital treatment. While it may be safely asserted that *any* case of pneumonia applying to a hospital will be received as an in-patient, it is possible that only the worst cases do actually apply, and that the hospital does not get a fair sample of cases of pneumonia even from the industrial class which furnishes the hospital population.

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[14] Fismer, "Die Resultate d. Kaltwasserbehandlung b. d. ac. croup. Pneumonie." *Deutsch. Arch. f. Klin. Med.* 1873, XI, 391.

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[15] Huss, *Die Behandlung der Lungenentzündung und ihre statistisch. Verhältn. nach* 16-*jähr. Erfahrung aus d. Seraph-Lazarette i. Stockholm.* Übersetz. v. J. Anger, Leipzig, 1861.

[16] For a discussion of epidemics of pneumonia and the geographical distribution of the disease, see Hirsch, *Handbook of Geogr. and Hist. Pathology*, Creighton's trans., vol. iii, chap. 6.

This point was investigated by Huss. He found that the fatality of pneumonia in the Stockholm Military Hospital (670 cases) was 7·31 per cent. Cases occurring among the soldiers would be seen and treated from the onset, and not submitted to the form of selection just noticed. All these patients must have been between the ages of 20—40 years; and his hospital cases gave for the same age group a fatality of about 11 per cent. On the basis of these figures it would seem that the fatality of the hospital cases is roughly eleven-sevenths of the fatality of cases treated from the onset. This is, of course, an extremely rough approximation, and probably exaggerates the difference, since the soldiers will be a physically select class. Using it as a rough check, we find that the fatality between 20—40 is about 11·7 per cent. for the Leipzig males, and 24·2 per cent. for the London Hospital patients; multiplying the last figure by seven-elevenths, we have 15·4 per cent. as the value corrected on the Stockholm basis, which is still very much above the Leipzig rate. We seem, therefore, to require the aid of another factor, viz., that of social class. The obligatory members of the Leipzig Krankenkasse consist for the most part of skilled workmen in regular employment who have undergone some rough selection from the point of view of bodily fitness; the hospitals of a city like London draw their patients mainly, as we have seen, from the poorest ranks of society, from a class containing a high percentage of casual labourers. These classes possibly differ congenitally in the sense that they are sprung from stocks of unequal fitness, and they certainly differ in their environments, using the word environment in a wide sense. It is possible, even probable, that much of the difference in rate of fatality can be attributed to the whole of these inherited and acquired conditions—in a word, that the figures provide us with a rough arithmetical measure of the disease-resisting powers of the very poor and of the moderately prosperous.

We have not specifically referred to the effect of nationality, isolated from climatic conditions, on the prognosis of pneumonia for two grounds; in the first place the data from Johns Hopkins Hospital in Baltimore, so far as they go, do not seem to warrant our attaching much importance to nationality *per se;* and in the second place, the data from Austria, Switzerland and Sweden when combined with the English results do not yield any fair basis of argument. We have no material for instituting a comparison between very widely separate peoples, such as the black and white races.

Whether our speculations respecting the source of the discrepancy we have noted be or be not correct, it is at any rate true that our results afford a striking illustration of the incorrect ideas respecting case mortality which might be derived from an exclusive study of hospital records. We must not prolong this paper by a further discussion of speculative ideas.

While our inquiry has been in some directions practically barren of results and we have by no means realised the expectations with which we embarked upon it, yet it may be that a part of the material presented is not without interest to the statistician and we hope at least to have spared subsequent inquirers some fruitless toil.

Summary of main conclusions.

1. The fatality of simple fractures of the leg diminished greatly and almost steadily down to fifty years ago, since then the change has not been regular.
2. There is a slight but probably significant difference between the male and female rates.
3. The fatality of compound fractures has diminished steadily down to the present time, but the data are imperfect.
4. The hospital fatality of lobar pneumonia has changed little during the last fifty years, and there is no sexual difference in the rates which can be regarded as statistically significant.
5. The experience of different London hospitals is concordant but great discrepancies exist on extending the comparison to other countries.
6. The change in fatality with age can be roughly represented by a straight line.
7. The apparently lower rate of fatality among patients not treated in hospitals is, perhaps, to a large extent due to differences in social class, but to settle the point we should require a long series of English cases from the classes not treated in hospitals.[17]

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[17] I am much indebted to my friend Mr. G. Udny Yule, who kindly went through the whole of the MS. and suggested several important modifications.—M.G.

APPENDIX.

TABLE I.—*Simple fractures of the leg*, 1751-1903.*

Years.	Totals.	Deaths.	Percentage fatality.	Mean age.*	Standard deviation of ages.	Coefficient of variation.
1751-62 (only '61-62 give ages)	399	29	7·27	37 9	16·4	43·3
'63-72	565	51	9·03	37·3	14·9	39·9
'73-82	442	14	3·17	35·9	16·3	45·4
'83-92	457	11	2·41	36·6	16·4	44·8
'93-1801 ('96, '98, 1900, and half '01 missing) ...	225	11	4 89	38·5	15·6	40·5
1814-23	480	22	4·58	37·4	17·4	46·5
'24-33	674	18	2 67	36·3	17·3	47·7
'34-43	992	25	2 52	36·9	16·0	43·4
'44-53 (– '47)	1,271	24	1·89	34·7	16·5	47 6
'54-63 (– '54 and '63) ...	1,266	11	0 87	33·4	16·4	49·1
'64-73 (–'64, '65, '72, '73)	1,459	15	1·03	34·3	17.0	49·6
'74-83 (middle 4 years)	1,317	13	0·99	33·9	17·1	50 4
'84-93 (middle 4 years)	1,203	4	0·33	35·1	16·3	46·4
'94-1903 (middle 4 years)	1,154	7	0·61	35·6	17·1	48·0

* The age grouping used ran: 1—5, 6—15, 16—25, &c. In calculating means it was assumed that the age entries refer to age at last birthday so that a person entered as *m* years was on the average *m* + ·5 years old. Later tables are usually given with groupings comparable with those of most *medical* writers. It was found on a sample of 3,426 cases that using the unsatisfactory grouping 1—10, 11—20, &c., did not appreciably alter the values. In any case the figures are only of interest for comparative purposes as age records in this type of material are notoriously inaccurate.

TABLE II.—*Simple fractures of the leg.*
MALES ONLY.

Years.	Number of cases.	Number of deaths.	Percentage fatality.		Mean age.	Standard deviation of ages.	Coefficient of variation.
1844–53	1,066	18	1·7	1·13	33·4	15·8	47·3
'54–63	1,044	9	0·85				
'64–73	1,166	10	0 86				
'74–83	1,039	9	0·87	0·64	33·1	16·3	49·2
'84–93	916	4	0·44				
'94–1903 ...	865	5	0·59				

TABLE III.
FEMALES ONLY.

1844–53	205	6	2·9	1·81	36·8	20·1	54·6
'54–63	222	2	0·9				
'64–73	293	5	1·7				
'74–83	278	4	1·4	0·70	39·5	17·6	44·6
'84–93	287	—	—				
'94–1903 ...	289	2	0·69				

TABLE IV.—*Correlation between age and severity in simple fracture cases.*

Years.	Number of cases.	Correlation.	Years.	Number of cases.	Correlation.
A. ALL CASES.			B. MALES ONLY.		
1761–92	1,534	·21 ± ·05			
'93–1843	2,368	·30 ± ·04			
1844–73	3,998	·48 ± ·03	1844–73.......	3,277	·41 ± ·03
'74–1903	3,674	·31 ± ·03	'74–1903....	2,820	·37 ± ·03

TABLE IVA.—*Case mortality per* 1,000. *Corrected for ages, the admissions* 1884-1903 *being taken as the standard population.*

Years.	Case mortality per 1,000.	Case mortality divided by the standard rate.	Years.	Case mortality per 1,000.	Case mortality divided by the standard rate.
1751–82	62·191	13·3	1854–83........	10·294	2·2
'83–1823 ..	38·080	8·2	'84–1903....	4·667	1·0
1824–53........	19·918	4·3			

TABLE V.—*Age-distribution of males,* 1831-1903, *admitted with fracture of tibia or fibula (exclusive of Pott's fracture*).*

Age Group.	Tibia.	Fibula.	Age Group.	Tibia.	Fibula.
1— 5	143	19	56—60	33	72
6—10........	243	61	61—65	27	34
11—15........	170	58	66—70	6	21
16—20........	100	109	71—75	4	7
21—25	101	253	76—80	3	1
26—30	106	337	81—85	1	0
31—35	105	285			
36—40........	127	279	Totals	1,390	2,036
41—45	98	209			
46—50	64	184	Means ...	25·7 years	35·1 years
51—55........	59	107			

* All such fractures are due to combined eversion and abduction of the foot.

TABLE VI.—*Age graduation of fractures of fibula, males*, 1831-1903.

Age.	Observed.	Calculated.*	Age.	Observed.	Calculated.*
1— 5	19	14	46—50	184	175
6—10	61	38	51—55	107	114
11—15.......	58	84	56—60	72	66
16—20.......	109	151	61—65	34	32
21—25	253	227	66—70	21	14
26—30	337	283	71—75	7	6
31—35	285	305	76—80	1	2
36—40	279	286	81—85	0	1
41—45.......	209	236			

* The constants deduced from the observations by the methods of moments were :—

$$\beta_1 = {\cdot}03997,\ \beta_2 = 2{\cdot}90929,\ \kappa_2 = -{\cdot}10055,\ r = 37{\cdot}21879,$$

the equation to the frequency-curve was :—

$$y = 306{\cdot}91\left(1 + \frac{x}{11{\cdot}6127}\right)^{11{\cdot}9845} \times \left(1 - \frac{x}{22{\cdot}5718}\right)^{23{\cdot}2343} \text{ the skewness} = {\cdot}1132.$$

Mode at 33·58, Mean at 35·1 years.

TABLE VII.—*Age-distributions of* 865 *male and* 289 *female patients admitted for simple fractures of the leg*, 1897-1900, *compared with the age constitution of Stepney* (*Census of* 1901).

(Numbers expressed as percentages.)

Age Group.	Males.		Females.	
	Fractures.	Census.	Fractures.	Census.
0— 4	3·35	13·23	5·54	13·45
5— 9	10·40	11·23	6·23	11·65
10—14	4·74	10·15	2·77	10·28
15—19	3·93	9·84	2·08	10·32
20—24	4·51	10·45	3·46	10·63
25—29	8·55	9·21	7·96	8·80
30—34	12·72	7·91	9·00	7·23
35—39	13·18	6·87	9·00	6·29
40—44	11·45	5·60	11·42	5·13
45—49	11·21	4·37	13·49	4·20
50—54	7·17	3·78	9·00	3·60
55—59	3·47	2·58	5·54	2·57
60—64	3·24	2·12	9·69	2·30
65—69	1·15	1·26	2·08	1·54
70—74	0·58	0·79	1·73	1·09
75—79	0·23	0·43	1·04	0·63
80—84	0·12	0·16	—	0·29

TABLE VIII.—*Simple fractures of the thigh*, 1751-1903.

Years.	Total.	Deaths.	Percentage fatality.	Mean age.	Standard deviation of ages	Coefficient of variation.
1751-62 (only '61, '62 give ages)	161	15	9·3	32·4	18·2	56·2
'63-72	156	6	3·9	32·3	20·3	62·8
'73-82	200	12	6·0	30·0	20·2	67·3
'83-92	153	3	2·0	30·4	19·4	63·8
'93-1802 (5½ years missing)	95	4	4·2	32·5	21·9	67·4
1814-23	269	16	6·0	33·3	22·1	66·4
'24-33	343	36	10·5	36·3	24·4	67·2
'34-43	470	37	7·9	36·0	25·1	69·7
'44-53 ('47 missing)	554	25	4·5	31·3	26·1	83·4
'54-63	743	30	4·0	30·2	25·4	84·1
'64-73	930	26	2·8	29·1	25·0	85·9
'74-83	1,044	61	5·8	29·5	25·8	87·5
'84-93	922	30	3·3	29·6	26·0	87·8
'94-1903	833	14	1·7	28·8	25·7	89·2
Total	6,873	315	4·6	—	—	—

TABLE IX.—*Simple fractures of the thigh.*

MALES ONLY.

Years.	Number of cases.	Number of deaths.	Percentage fatality.		Mean age.	Standard deviation.	Coefficient of variation.
1844-53	403	9	2·2	2·6	26·6	22·4	84·2
'54-63	550	22	4·0				
'64-73	673	12	1·8				
'74-83	726	32	4·4	3·0	25·0	23·0	92·0
'84-93	645	18	2·8				
'94-1903	592	8	1·4				

TABLE X.

FEMALES ONLY.

1844-53	151	16	10·6	6·3	38·3	31·4	82·0
'54-63	193	8	4·1				
'64-73	257	14	5·4				
'74-83	318	29	9·1	5·6	38·4	30·0	78·1
'84-93	277	12	4·3				
'91-1903	241	6	2·5				

TABLE XI.—*Correlation between age and severity in simple fractures of the thigh.*

Years.	Number of cases.	Correlation.	Years.	Number of cases.	Correlation.
A. ALL CASES.			B. MALES ONLY.		
1761–92	537	·24 ± ·08			
'93–1843 ...	1,175	·54 ± ·04			
1844–73	2,224	·52 ± ·03	1844–73.......	1,623	·48 ± ·04
'74–1903	2,800	·38 ± ·03	'74–1903...	1,960	·37 ± ·04

TABLE XII.—*Fatality of compound fractures of the leg.* (*All cases.*)

Period.	Number of cases.	Number of deaths.	Percentage fatality.
1752–1801	241	100	41·5
1801–50	250	85	34·0
'51–65	278	89	32·0
'66–76	289	65	22·5
'77–90	299	44	14·7
'91–1903	257	9	3·5

TABLE XIII.—*Pneumonia statistics. London Hospital*, 1784-1903.

Years.	Number of cases.	Deaths.	Percentage fatality.	Mean age.	Standard deviation of ages.	Coefficient of variation.
1784-1800	235	59	25·1	33·4	13·6	40·7
1814–30	186	61	32·8	32·9	12·1	36·8
'31–53	155	40	25·8	32·9	12·1	36·8
'54-63	201	46	22·9	30·1	14·9	49·5
'64–73	254	62	24·4	26·9	14·2	52·8
'74-83 ...	456	126	27·6	27·9	14·7	52·7
'84-93	1,749	348	19·9	24·9	15·1	60·6
'94-1903	2,456	415	16·9	22·6	14·8	65·6
Totals	5,692	1,157	20·3	—	—	—

TABLE XIV.—*Percentage case mortality of lobar pneumonia, London Hospital*, 1831-1903.

No figures are given which are based on less than 20 observations. The probable errors have been calculated by $E = \frac{67 \cdot 449}{n} \sqrt{\bar{p}\bar{q}(n+1)}$.

This formula is not satisfactory for small values of $\bar{p}$. To call attention to this, the probable errors in doubtful cases are enclosed in brackets.

Age group.	1831-54.		1854-63.		1864-73.	
	Males.	Females.	Males.	Females.	Males.	Females.
0— 5	....	....	....	....	....	....
6—10	....	....	....	....	....	....
11—15	....	....	....	....	....	....
16—20	....	....	10·0 ± 4·6	....	....	....
21—25	....	....	9·4 ± 3·5	....	21·6 ± 4·6	....
26—30	36·4 ± 7·1	....	....	....	14·8 ± 4·7	....
31—35	....	....	....	....	26·1 ± 6·3	....
36—40	....	....	....	....	....	....
41—45	....	....	....	....	....	....
46—50	....	....	....	....	....	....
51—55	....	....	....	....	....	....
56—60	....	....	....	....	....	....
61—65	....	....	....	....	....	....
1—10	....	..	....	....	....	....
11—20	....	....	15·4 ± 4·9	....	12·9 ± 4·1	8·7 ± 4·0
21—30	27·5 ± 4·8	35·0 ± 7·4	10·9 ± 3·1	....	18·8 ± 3·3	9·1 ± 4·2
31—40	24·1 ± 5·5	....	31·4 ± 5·4	....	31·4 ± 5·4	....
41—50	....	....	34·8 ± 6·8	....	....	....
51—60	....	....	....	....	....	....
61—70	....	....	....	....	....	....

Age group.	1874-83.		1884-93.		1894-1903.	
	Males.	Females.	Males.	Females.	Males.	Females.
0— 5	36·7 ± 6·0	....	15·1 ± 2·2	18·9 ± 3·1	7·8 ± [1·3]	4·5 ± [1·3]
6—10	...	....	1·8 ± [0·9]	7·9 ± [2·3]	1·7 ± [0·6]	2·7 ± [1·0]
11—15	5·0 ± [3·4]	....	4·8 ± [1·3]	1·9 ± [1·3]	2·2 ± [0·7]	3·8 ± [1·5]
16—20	17·4 ± 3·8	13·6 ± 5·0	10·0 ± 1·5	7·0 ± [2·3]	7·3 ± [1·0]	13·8 ± 2·6
21—25	16·7 ± 4·2	....	15·5 ± 2·1	15·0 ± 3·1	10·3 ± 1·4	14·0 ± 3·6
26—30	30·2 ± 4·8	....	28·5 ± 2·5	12·2 ± 3·2	24·1 ± 2·2	16·7 ± 3·7
31—35	20·0 ± 5·0	....	34·6 ± 3·2	29·5 ± 4·7	29·5 ± 2·6	17·9 ± 5·0
36—40	32·4 ± 5·3	....	36·0 ± 3·1	28·6 ± 5·2	40·6 ± 2·8	43·6 ± 5·4
41—45	41·2 ± 5·8	....	42·1 ± 3·8	....	31·8 ± 3·4	40·0 ± 7·6
46—50	...	....	40·3 ± 4·2	....	45·6 ± 4·1	....
51—55	....	....	16·7 ± 4·2	....	58·7 ± 4·9	....
56—60	....	....	....	....	54·8 ± 6·1	....
61—65	....	....	....	....	....	
1—10	25·5 ± 4·3	17·4 ± 5·4	8·7 ± 1·3	13·9 ± 2·0	4·4 ± [0·7]	3·6 ± [·84]
11—20	13·6 ± 2·9	9·7 ± 3·6	7·8 ± [1·0]	4·5 ± [1·3]	5·2 ± [0·7]	8·8 ± 1·5
21—30	24·1 ± 3·3	39·4 ± 5·8	22·2 ± 1·6	13·8 ± 2·2	16·6 ± 1·3	15·4 ± 2·6
31—40	26·9 ± 3·7	30·0 ± 7·1	35·3 ± 2·2	29·1 ± 3·5	35·1 ± 2·0	32·8 ± 3·9
41—50	43·4 ± 4·6	....	41·3 ± 2·8	23·3 ± 5·3	37·8 ± 2·6	42·9 ± 5·7
51—60	61·9 ± 7·3	....	30·1 ± 4·2	....	57·1 ± 3·8	...
61—70	....	....	54·5 ± 7·3	....	78·3 ± 5·9	...

TABLE XV.—*Pneumonia*, 1854-1903.

MALES.

Ages.	Totals.	Deaths.	Percentage case mortality.
0— 5	353	50	14·16 ± 1·25
6—10	380	8	2·10 ± [0·497]
11—15	394	15	3·81 ± [0·65]
16—20	551	53	9·62 ± 0·85
21—25	450	60	13·33 ± 1·08
26—30	405	103	25·43 ± 1·46
31—35	314	94	29·94 ± 1·74
36—40	320	121	37·81 ± 1·83
41—45	223	85	38·12 ± 2·19
46—50	165	73	44·24 ± 2·62
51—55	108	43	39·81 ± 3·19
56—60	68	39	57·35 ± 4·07
61—65	46	26	56·52 ± 4·98
66—70	14	9	64·29 ± 8·94
71—	10	6	60·00 ± 10·96
Totals	3,801	785	20·65

FEMALES.

Ages.	Totals.	Deaths.	Percentage case mortality.
0— 5	207	26	12·56 ± 1·55
6—10	197	12	6·09 ± [1·15]
11—15	155	5	3·23 ± [0·96]
16—20	182	23	12·64 ± 1·67
21—25	141	21	14·89 ± 2·03
26—30	128	24	18·75 ± 2·34
31—35	90	23	25·56 ± 3·12
36—40	87	31	35·63 ± 3·48
41—45	44	16	36·36 ± 4·95
46—50	36	12	33·33 ± 5·37
51—55	28	12	42·86 ± 6·42
56—60	11	5	45·45 ± 10·58
61—	9	2	22·22 ± 9·85
Totals	1,315	212	16·12

TABLE XVI.—*Pneumonia statistics*, 1854-1903. *Sexual differences in fatality.*

Age group.	Sex with higher fatality rate.	Difference and probable error.	Ratio of difference to its probable error.
16—20	Female	3·02 ± 1·87	1·31
21—25	,,	1·56 ± 2·30	0·68
26—30	Male	6·68 ± 2·76	2·42
31—35	,,	4·38 ± 3·57	1·23
36—40	,,	2·18 ± 3·93	0·55
41—45	,,	1·76 ± 5·41	0·33
46—50	,,	10·91 ± 5·98	1·82
51—55	Female	3·05 ± 7·17	0·43
56—60	Male	11·90 ± 11·33	1·05

TABLE XVII.—*Pneumonia—case mortality. Summary of chief published series of hospital statistics.*

[As the crude figures are generally not published, it has not been possible to use the same age grouping throughout.]

LONDON HOSPITAL, 1854-1903 (Greenwood and Candy).

Age.	Total number of cases.		Percentage fatality.	
	Males.	Females.	Males.	Females.
0—10	733	404	7·9	9·4
11—20	945	337	7·2	8·3
21—30	855	269	19·1	16·7
31—40	634	177	33·9	30·5
41—50	388	80	49·7	35·0
51—60	176	39	46·6	43·6
61—70	60	9	58·3	22·2
71	10		60·0	
	3,801	1,315	—	—

ST. BARTHOLOMEW'S HOSPITAL, 1897-1906 (Brown, Roy. Soc. Med.).

Age.	Total number of cases.		Percentage fatality.	
	Males.	Females.	Males.	Females.
Under 15	131	55	2·3	·0
15—20	180	59	4·4	5·1
20—30	210	47	10·5	4·3
30—40	177	44	26·0	20·5
40—50	108	22	30·6	31·8
50—60	48	12	50·0	41·7
Over 60	11	7	54·5	71·4
	865	246	—	—

GUY'S HOSPITAL,* 1902-06 (Fawcett, Roy. Soc. Med.).

Age.	Total number of cases.	Percentage fatality.
1—10	285	6·0
11—20	174	7·5
21—30	98	22·4
31—40	80	28·8
41—50..........	56	41·1
51—60	24	41·7
Over 60	10	60·0
	727	—

MIDDLESEX, KING'S COLLEGE, WESTMINSTER (Pasteur and others, Roy. Soc. Med.), 1897-1906.

Age.	Total number of cases.	Percentage fatality.
10—19	306	5·6
20—29	308	14·9
30—39	207	34·3
40—49	191	38·7
50—59	83	57·8
60, &c.	50	66·0
	1,145	—

* Sexes not given separately.

TABLE XVII *Contd.—Pneumonia—case mortality.*

ST. MARY'S and CHARING CROSS HOSPITALS, 1897-1906 (Coby and Bosanquet, Roy. Soc. Med.).

Age.	Total number of cases.	Percentage fatality.
10—20	180	7·2
21—30	204	18·1
31—40............	139	30·2
41—50............	79	40·5
51—60	26	30·8
61, &c............	19	52·6
	647	—

ST. THOMAS' HOSPITAL, 1880-90 (Hadden, McKenzie and Ord).

Age.	Total number of cases.	Percentage fatality.
0—10	123	7·3
11—20	182	4·4
21—30	153	22·2
31—40	120	30·8
41—50	85	37·6
51—60	27	55·6
61, &c.	15	66·7
	705	—

MIDDLESEX HOSPITAL (Sturges and Coupland).

Age.	Total number of cases.	Pe centage fatality.
0— 9........	188	2·7
10—19	239	4·8
20—29........	230	17·0
30—39	147	31·3
40—49............	107	47·7
50—59............	62	40·3
60—69, &c. ..	26	38·5
	999	—

JOHNS HOPKINS HOSPITAL, 1889-1905 (Chatard* J. H. H. Reports, xv, 1910, 55).

Age.	Total number of cases.	Percentage fatality.
1—10	47	6·4
10—20	69	17·4
20—30	212	19·3
30—40	150	30·0
40—50	88	43·2
50—60	42	57·1
60—70	30	83·3
70	14	57·1
	652	—

* Including 35 "terminal" pneumonias.

WESTERN INFIRMARY, GLASGOW (J. G. Andrew, *Age incidence, &c., and comparative frequency in disease*, page 235. London, 1909.

Age.	Total number of cases.		Percentage fatality.	
	Males.	Females.	Males.	Females.
1—10	27	11	3·7	9·1
10—20	164	43	4·9	7·0
20—30	254	53	15·0	15·1
30—40	150	45	29·3	31·1
40—50	134	22	39·6	45·5
50—60	58	7	51·7	28·6
60—	27	2	51·9	50·0
Totals	814	183	—	—

TABLE XVIII.—*Pneumonia cases (males) 1854-1903. Graduation of fatality rates.*

Age group.	Actual percentage fatality observed.	Calculated (1).*	Calculated (2).*	Age group.	Actual percentage fatality observed.	Calculated (1).*	Calculated (2).*
6—10....	2·1	—	0·3	41—45	38·1	40·4	39·3
11—15 .	3·8	5·3	4·2	46—50	44·2	46·3	45·5
16—20 ..	9·6	11·2	9·2	51—55	39·8	52·1	51·5
21—25....	13·3	17·0	14·8	56—60	57·4	58·0	57·0
26—30....	25·4	22·9	20·7	61—65	56·5	63·8	61·4
31—35....	29·9	28·7	26·8	66—70 ..	64·3	69·7	62·1
36—40..	37·8	31·6	33·0	70	60·0	75·5	—

* (1) Gives ordinates of the line $y = 5{\cdot}8476\,x - 7{\cdot}1130$. y measured from 30 per cent.; origin of x mid point of group 26—30. (2) Gives ordinates of the skew curve $y = 62{\cdot}711\left(1 + \frac{x}{11{\cdot}801}\right)^{1{\cdot}2474}\left(1 - \frac{x}{{\cdot}7914}\right)^{{\cdot}08359}$

TABLE XIX.—*Age constitution of the male cases of pneumonia admitted 1899-1903 (1,094 cases) compared with the age constitution of the male inhabitants of Stepney.*

[Numbers reduced to percentages.]

Age group.	Pneumonia patients.	Inhabitants of Stepney.	Age group.	Pneumonia patients.	Inhabitants of Stepney.
0— 4	10·05	13·23	35—39	6·76	6·87
5— 9........	12·07	11·23	40—44	5·30	5·60
10—14.......	11·61	10·15	45—49	3·29	4·37
15—19........	15·90	9·84	50—54	2·93	3·78
20—24	12·34	10·45	55—59........	1·83	2·58
25—29........	8·78	9·21	60—64........	1·10	2·12
30—34	7·13	7·91	64	0·91	2·64

TABLE XX.—*Pneumonia fatality statistics.*
Data other than hospital records.

Ages.	Total number of cases.		Number of deaths.		Percentage fatality.	
	Males.	Females.	Males.	Females.	Males.	Females.
A. *Collective Investigation Committee of Brit. Med. Assoc.**						
—10........	107	59	9	4	8·4	6·8
11—20	144	74	6	8	4·2	10·8
21—30........	143	72	15	12	10·5	16·7
31—40........	110	56	23	12	20·9	21·4
41—50........	90	31	31	7	34·4	22·6
51—60........	47	24	16	9	34·0	37·5
61—70........	35	24	11	9	31·4	37·5
71—	11	12	6	8	54·6	66·7
Totals	687	352	117	69	17·0	19·6

* C. I. R., ii, 29.

TABLE XX *Contd.—Pneumonia fatality statistics.*

Ages.	Total number of cases.		Number of deaths.		Percentage fatality.	
	Males.	Females.	Males.	Females.	Males.	Females.
B. *Versicherungspflichtige Mitglieder of the Leipzig Krankenkasse.**						
—15	25	—	0	—	—	—
15—19	596	—	23	—	3 9	—
20—24	459	—	32	—	7·0	—
25—29	438	—	56	—	12·8	—
30—34	417	—	50	—	12·0	—
35—39	392	—	61	—	15·6	—
40—44	361	—	62	—	17·2	—
45—49	281	—	57	—	20·3	—
50—54	187	—	47	—	25·1	—
55—59	130	—	43	—	33·1	—
60—64	93	—	34	—	36 6	—
65—69	55	—	22	—	40·0	—
70—	38	—	13	—	34·2	—
Totals	3,471	—	500	—	14·4	—

* *Krankheitsverhältnisse f. Leipzig, &c.* Berlin: Heymann, 1910.

TABLE XXI.—I. *London Hospital pneumonia statistics* (*males* 1854-1903).
Regrouped to admit of comparison with the Leipzig data.

Ages.	Cases.	Deaths.	Percentage fatality.	Ages.	Cases.	Deaths.	Percentage fatality.
— 4 ..	281	45	16·01	45—49	170	62	36·47
5— 9 ...	285	12	3·12	50—54	132	60	45·45
10—14 ..	362	13	3·59	55—59 ...	74	43	58·11
15—19 ...	545	40	7·34	60—64	50	26	52·00
20—24	471	61	12·95	65—69	19	10	52·63
25—29	412	96	23·30	70	12	8	66·67
30—34 ..	325	101	31·08				
35—39	310	109	35·16				
40—44	253	99	39·13		3,801	785	—

II. *Comparison of London Hospital and Leipzig fatality rates for five large groups.*

Age group.	Difference.	Probable error of difference.	Ratio of difference and probable error.	Age group.	Difference.	Probable error of difference.	Ratio of difference and probable error.
20—24	5 98	1·32	4·53	35—39	19·60	2·21	8·87
25—29	10·51	1·77	5·94	40—44	21·96	2·46	8·93
30—34	19·09	2·04	9·36				

TABLE XXII.—*Graduation of the Leipzig fatality rates.*

Column (1) gives the observed percentages.

Column (2), ordinates of the best straight line, viz., $Y = 3·74 + 3·144X$, where Y is measured from the fatality at ages 15—19, and the unit of X is 5 years.

Column (3), ordinates of the skew-curve. $y = 3·3919(x + 13·2683)^{1·0040}(-x)^{-·0521}$. Origin at the end of the range, which extends from 11·2 to 77·6 years, the unit being 5 years.

Ages.	(1.)	(2.)	(3.)	Ages.	(1.)	(2.)	(3.)
—15....	0	0·60	0·74	45—49	20·28	22·61	22·58
15—19....	3·86	3·74	3·73	50—54	25·13	25·75	25·96
20—24 ...	6·97	6·89	6·76	55—59	33·08	28·90	29·45
25—29....	12·79	10·03	9·83	60—64	36·56	32·04	33·15
30—34 ...	11·99	13·18	12·93	65—69	40·00	35·18	37·19
35—39 ..	15·56	16·32	16·09	70—	34·21	38·33	41·97 (ages 70—74)
40—44 ...	17·17	19·46	19·30				

TABLE XXIII.—*Statistics of the Seraphim Hospital, Stockholm*, 1840–55. (*Huss.*)

All cases.				*Excluding patients admitted in a moribund state.*			
Ages.	Number of cases.	Number of deaths.	Percentage fatality.	Ages.	Number of cases.	Number of deaths.	Percentage fatality.
5—10....	9	1	11·1	5—10	9	1	11·1
10—20....	233	18	7·7	10—20	229	14	6·1
20—30....	1,064	84	7·9	20—30	1,041	61	5·9
30—40 ..	847	128	15·1	30—40 ...	816	97	11·9
40—50...	382	91	23·8	40—50 ..	363	72	19·8
50—60 ..	134	36	26·9	50—60	125	27	21·6
60—70 ..	36	14	38·9	60—70	29	7	24·1
70—80...	5	3	60·0	70—80	4	2	50·0
Totals	2,710	375	13·8		2,616	281	10·7

TABLE XXIV.—*Stockholm cases* (*Huss*). *Sex distribution.*

Ages.	Males.			Females.		
	Cases.	Deaths.	Percentage fatality.	Cases.	Deaths.	Percentage fatality.
5—10........	6	1	16·7	3	—	—
10—20	195	8	4·1	34	6	17·7
20—30........	901	48	5·3	140	13	9·3
30—40........	714	78	10·9	102	19	18·6
40—50........	284	60	21·1	79	12	15·2
50—60	69	17	24·6	56	10	17·9
60—70	16	5	31·3	13	2	15·4
70—80	2	2	100·0	2	—	—
Totals	2,187	219	10·01	429	62	14·5

DISCUSSION *on* MR. GREENWOOD *and* MR. CANDY'S PAPER.

MR. YULE said he had much pleasure in proposing a vote of thanks to Mr. Greenwood and Mr. Candy for bringing this Paper before the Society. The authors deserved, indeed, a particularly hearty vote of thanks because, judging from the conclusion of the Paper, they seemed to feel somewhat depressed at the lack of definiteness in their results; they suggested that their enquiries had been in some directions barren, with the result that Mr. Greenwood and his colleague had by no means realised the expectations with which they embarked on the enquiry. But the value of a paper ought not to be judged simply from the definiteness of the results obtained. They had at the London Hospital a record of unequalled length as regards the data afforded. It had no doubt occurred to many that such data required investigation, that a number of useful and interesting results ought to be deduced from such data; but nobody seemed to have undertaken the task of investigation, and it was left to Mr. Greenwood and his colleague to undertake this research. They could not tell until the enquiry had made considerable progress how far the data would show striking changes, or how far they might only give results of most doubtful interpretation. It was a great deal to have at least exhibited clearly what were the difficulties in interpreting such data, and possibly to suggest some directions in which they might be improved for comparative purposes. How great were the difficulties of comparison was illustrated by passage after passage in the Paper. First, there were difficulties arising from the selective character of the data. The patients were selected from a special social class; and the intensity of such selection might have changed during the very long period under review. As stated at the beginning of the Paper, the percentage of labourers recorded in the admission books was 23 per cent. at the beginning of the period, and 17 per cent. at the end. But this difference was fairly considerable—nearly one-third of the latter figure—and it certainly raised some doubt how far the data at the beginning and the end of the period were strictly comparable as regards social class. Again, there was a certain selection of cases, probably to an unknown extent, according to severity; the less severe cases might not have gone to the hospital. There was, again, apparently the possibility of selection according to sex, so that one sex might not appear in its proper proportion, *e.g.*, in pneumonia cases. Again, the methods of diagnosis had changed, and were no doubt much better now than they used to be; and that might introduce a whole series of sources of error in making a comparison over a long period. Then, again, the age and sex composition of patients might have changed; and that introduced a further source of difficulty in comparison between the beginning and the end of the period under review; but that difficulty could to a certain extent be obviated by well-known methods. In the case of fractures of the leg there was another difficulty of quite a different kind to which attention was drawn, namely, that the death might not be due to the fracture, but to shock; that introduced a source of error which had to be allowed for in some way. Again, fractures of the leg might be excluded from the records (of amputation cases) in certain cases. Finally, the mere case mortality might be misleading as a guide to what they actually wanted to know, viz., the success of surgical or medical treatment, because, although death might not have resulted, it did not necessarily follow that the patients were discharged as thoroughly cured in the olden days as in the present. Therefore the problem of comparison bristled with difficulties. Beyond all these difficulties, but by no means the least, they had the question, which the authors had dealt with at considerable length, of "fluctuations of sampling," as they were termed. Even if the general conditions remained precisely the same from year to year, one would nevertheless expect more or less considerable fluctuations in the number of deaths from any cause for precisely the same reasons as one expected variations in the proportion of sixes in throwing dice. The magnitude of such fluctuations in the case of dice-throwing could be foretold on theoretical grounds; and if anybody were sceptical as regards the theory he would find that actual experiments had been carried out for checking theory by making long series of throws. In certain forms of mortality the fluctuations one got from year to year were measured with beautiful accuracy by a formula based on the simple theory as applied to dice-throwing. A very good case was one given by von Bortkewitsch, viz., the numbers of deaths in certain German Army Corps from the kick of a horse; it was a particularly simple case, because the number of men and all the conditions were fixed. The fluctuations in deaths from year to year in that case were measured almost precisely to the second place of decimals by the theoretical formula. But that simple theory did not apply to the ordinary population of both sexes and varied ages, even in the case of pure accidents, and there were further risks in applying it when dealing with many causes of death which were not pure accident. When throwing well-made ordinary dice the chance of getting a six was approximately the same for every die at every throw, and the theory was simple. But if one had a lot of bad dice, or possibly a set which one had collected for one's own private purposes, in which the chance of throwing a six with certain dice was very high and the chance of throwing a six with others was very low indeed, and one used a handful of such dice for throwing, the fluctuations in the proportion of sixes thrown would not be that given for the simple case of perfect dice. The population subject to the risk of mortality was like that handful of heterogeneous dice, for the two sexes and individuals of different ages were of quite different susceptibility to many causes of death, and probably many persons even of the same age and sex possessed organically different susceptibilities. With that form of heterogeneity the fluctuations of sampling would be rather less than would be expected in the simple case. But suppose that while the dice were bad, in the same sort of way, one took them up differently; suppose one began by making a series of throws with dice which were loaded so as to give sixes too frequently, then one went on to another series of throws with dice loaded to give sixes not so often as they should, and then with another series of ordinary good dice, and one pooled all those records together. In that case one would get a much higher fluctuation in the proportion of sixes than if one had used the good dice throughout. Again, that represented what happened in the deaths from various causes from year to year; in one year the weather might be favourable, and in another year it might be unfavourable. Again, there was yet another cause of divergence from simple theory. If one threw one die and one got a six, one was no more likely to get a six on throwing the next time. But that was not so if one had a case of infectious disease; if one had one case in a district in a certain period one was more likely to have another. In certain forms of accident even, *e.g.*, explosions in mines, if there was one death there was likely to be more than one. In such cases the events were not independent. All these sources of divergence rendered the applicability of the simple theory of sampling to test the significance of a certain death-rate based on a limited number of observations exceedingly difficult; the subject required a great deal more discussion than it had hitherto received, and he was very glad Mr. Greenwood and Mr. Candy had initiated such a discussion in this Paper. The question was raised nearly thirty years ago by Westergaard, who used in his book on mortality the simple binomial formula for testing the significance of death rates, but the subject had not received much attention in other quarters. As Mr. Greenwood had very well stated, the difficulties were objective difficulties—to determine precisely what they wanted to know, and how they were to represent the case theoretically in order to obtain some mathematical expression for the fluctuation of sampling under the conditions subsisting in fact and not in the usual simplified theory. Even in one of the authors' cases, where he would have expected a better result, it appeared that they had not got by any means the fluctuations of the simplest case of sampling alone; he referred to Table 8, "Fractures of the thigh," which the authors passed over rather briefly in one paragraph because the fluctuations in the fatality were so great. Inconveniently rather for theoretical purposes, the numbers in the first column of the table, on which the mortality was based, fluctuated a great deal themselves, so that no great weight could be attached to the theoretical result; but so far as the figures went, the standard deviation of the observed fatality rates was about twice as great as would have been expected from the theory of sampling in its simplest form. Why did the fatalities fluctuate so much in that case? Had Mr. Greenwood any reason to suggest? He would also like to ask one question with regard to the method used for excluding cases of simple fracture where death might be due to shock. About what proportion of cases had to be excluded owing to death taking place during the first three days, and had that proportion greatly changed during the long period under review?

Dr. Dudfield, in seconding the vote of thanks, said he agreed with Mr. Yule that the thanks of the Society were the more due to the authors in that they had submitted their Paper in spite of the disappointing results which they had obtained from their inquiry. He thought the time had come for systematic examination of hospital statistics. The results of the examination of the records of the Glasgow Infirmary had been recently published, and had been noted in the January issue of the *Journal.* Without wishing to question the authors' right to decide how they should deal with their data, he had one criticism to offer on the method adopted, a criticism based on medical rather than statistical grounds. He thought that the grouping of the periods was unfortunate in that such grouping had been made without reference to the epochal periods of medicine and surgery. Having regard to the great changes in surgery brought about by the introduction of anæsthetics and "Listerism," *i.e.*, antiseptic (or preferably "aseptic") methods of treatment, he would have liked to have seen the data relating to fractures grouped into periods which contrasted the results obtained before and since those changes. In the old days when such injuries were dealt with without anæsthetics, shock, apart from that due to the injury itself, played no small part in the after history of the case. The treatment of compound fractures prior to aseptic surgery yielded very different results to those now obtained. Even with the arrangement adopted by the authors, the figures given in Table I (simple fractures) and Table XII (compound fractures) indicated that such improvements in treatment had not been without effect on the fatalities. Turning to pneumonia, the change in the method of treatment had been nearly as important, bleeding, which was the rule, being now practically abandoned. Instead of doing everything which might lower the patient's resistance to the disease, every effort was made to strengthen his powers of resistance. That change in treatment he believed might be said to have been introduced somewhere between 1855 and 1865. But no matter how the data were handled there still remained a question as to the value of the data themselves. The authors said that the diagnoses on which their figures were based had been taken from the "admission books." It was desirable to know who kept those books, and what diagnosis had been entered therein. Was it the diagnosis made on admission to the hospital? Or was it the diagnosis made after observation of the case? The two were very frequently quite different. He might observe parenthetically that the two diseases chosen for examination were not diseases in which the fatality was deemed to be high, certainly not in the case of healthy young adults. The distribution as regards sex and age was, he thought, vitiated by two facts. In the first place, it was common knowledge that men were more ready to avail themselves of institutional treatment than women. To some extent that was due, in all probability, to the desire to preserve the life of the breadwinner of the family, whose death meant the break-up of the home, which could be carried on somehow even after the death of the mother. Moreover, the mother if she remained at home could do something to keep the home in order during her illness, unless she were very seriously incapacitated. Ages and occupations were well-known to be very unreliably stated, especially by hospital patients. It seemed, indeed, that all statistical data in connection with hospitals, except the actual diagnoses, or what were better still, post mortem examination results, required to be dealt with very circumspectly.

Mr. GREENWOOD in reply, having thanked Mr. Yule and Dr. Dudfield for their kind remarks, said the object of the Paper had been entirely fulfilled by what they had said. The fact was that hospital statistics were in many respects bad, but all the statistical knowledge that the medical student received was based entirely on those statistics; for, in the ordinary text-book which a young man going in for medicine read, the statistics of the fatality of disease were taken from, say Smith's series at St. Bartholomew's, or Jones's series at the London Hospital, and so on. It was therefore necessary to examine them. Another point was that, until one examined them at some length and produced cut and dried evidence as to where they were bad and might be improved, they were not going to be improved. The class of statistics discussed in the Paper was, perhaps, the best of them, strange as it might sound. If one took the statistics dealing with the inheritance of disease they seemed to a statistician perfectly humorous in their badness, and he did not believe they would ever be improved till some body like that Society—perhaps by means of a committee on the subject—made some pronouncement. Most hospital administrators would naturally retort to critics of their records, "You are abusing these things, but why don't you look into them?" Nobody ever looked into them or proposed any reform in the system. With regard to the points raised by Mr. Yule, they were purely on the statistical side, and they were therefore to him personally of extreme interest. Mr. Yule and he had had some talk over the Paper, and he intended to have much further talk with him on the subject. The problem of random dispersions in the case of a varying probability was an exceedingly troublesome thing to deal with statistically, but was very important, not so much in the cases dealt with as in the case of acutely infectious diseases, such as plague. This was a subject which came in his way, for he had had to investigate the statistics of plague. He would have, for instance, returns from an Indian province, and he would find that returns from certain villages showed a much greater mortality than the average of the whole district during a given epidemic. The problem was whether one could attribute this to local conditions, or whether it was an error in sampling. Then there came in all the difficulties which Mr. Yule had raised. His impression was that the only practicable way of dealing with the point was to treat the epidemic as a series of tests with the different sets of dice. The chance of death or of infection must be a function of at least two variables; of the exhaustion of susceptible people, and of the change in the virulence of the organism. The only way he could see of getting at it for the purpose of a practical test was to have the mortality from the epidemic divided up into very short intervals of time, and to compare the rate, so to speak, for each week, which could be roughly paralleled to a different series of sets of dice. The population at risk each week and the chance of infection during that week being known, it was possible to treat the figures by relatively simple methods which he need not go into. This was not very satisfactory from the mathematical standpoint, but it was an important statistical problem requiring immediate consideration. With regard to the fluctuations of the statistics of thigh fractures which Mr. Yule had referred to, the reason he did not feel inclined to attach much importance to them was the enormous variation in the age distribution from decennium to decennium; he strongly suspected that a fracture of the thigh might not be a single entity. Some of these cases were fracture of the neck of the bone in old people, others fracture of the shaft. Strictly speaking, they might be quite different classes of injury, which could not be compared. He could not say exactly the number which were excluded by the three-day rule, but it was not, he thought, very large. He felt quite clear, however, that something of that sort must be done because of the question of shock. With regard to the points raised by Dr. Dudfield most of them were medical; and he felt a certain diffidence in replying to them, because although he was a medical man in the technical sense, his name being included in the Medical Register, he did not think any "patients" of his could now be seen alive. As to the grouping in arbitrary periods of years he was not quite clear that that had made much difference, because those great improvements in medical treatment mentioned by Dr. Dudfield (he could only speak with regard to the London Hospital) had not been introduced at any hard and fast period. To take Listerism as an example, at the time he (Mr. Greenwood) was a student everyone practised the correct ritual; but when his father was a student, thirty to forty years ago, some of the surgeons practised the proper ritual of those days, with the carbolic spray always going; others, he believed, practised the old methods, operating in frock coats which had seen many a bloody day for years, while some tried a half-and-half procedure, so that it took many years for the process to become generalised; and he did not think there were any very sharp chronological lines of division. With regard to the treatment of pneumonia he would have thought that the custom of bleeding might have been given up rather earlier than Dr. Dudfield suggested. He thought it went out, as far as routine practice was concerned, in the fifties. As to diagnosis that was a point he tried to look into, and he was disposed to come to the paradoxical conclusion that the *recorded* diagnosis in the earlier days might be more accurate than at present. In the eighteenth and early nineteenth centuries the house staff, as it was now called, was non-existent; there were no house physicians or house surgeons, but there was a resident medical officer,[1] a man who held that appointment often for years, and was probably a fairly experienced person. If one looked at the entries in the old registers the diagnoses often contained many technical words. They were not, he thought, the diagnoses of the porter, who entered what occurred to him at the time. He suspected that they were either made by the surgeon, who perhaps attended even more frequently and regularly than now, or by the resident medical officer, who would be a much more experienced person in the long run than the house staff of the present day. When one came to modern times Dr. Dudfield's point was extremely sound; one could not be sure how far diagnoses were made by the receiving room officers, who were generally young men quite freshly qualified, and how far they had the *imprimatur* of the physician or surgeon, but when one took the particular diseases analysed in the Paper it seemed to him that fracture of the leg was a condition which any fairly experienced person was likely to diagnose correctly in most cases. In the case of pneumonia, not having to diagnose cases himself, he could say, with arm-chair confidence, that it seemed a fairly easy thing to diagnose in typical cases; and that was one of the reasons why Mr. Candy and he chose those two—on the ground that the diagnosis would be moderately easy. He quite agreed that the ages were probably very inaccurate, and as to the occupations the same remark applied. That was one reason why he suggested that 17 per cent. as against 24 per cent. might not mean a very great improvement. The occupations seemed to be rather less crudely analysed in the hospital admission books to-day than formerly. One found people described as "bricklayer's labourers" or under some other subdivisions. So far as he could judge, a person now simply described as "labourer" was not doing anything in particular. In the eighteenth century records of all kinds of people were perhaps included as labourers who would now have a special trade description. Some were agricultural labourers, because the hospital probably drew on a larger geographical area in the eighteenth century than it did now. As to the question of the cause of death after fracture a very small percentage of cases should perhaps be regarded as having died as the direct result of the fracture. Such directly conditioned deaths might result from fatty emboli, but were exceedingly rare; and he thoroughly agreed with Dr. Dudfield that hardly anyone died as the result of an ordinary fracture. The reason why so many people died in the old days was, as far as he could judge, and looking at the matter from a modern standpoint, improper treatment. The curious point was that if one looked at the old records, which gave the length of stay in the hospital, simple fracture cases were kept in often for months, sometimes quite colossal periods. What probably happened to them was that they became subject to bed-sores and got into an unpleasant condition generally, becoming liable to catch some of the infectious diseases which are said frequently to have ravaged a hospital in the old days. These deaths were due to the treatment of the fracture, not to the fracture itself. That was one of the reasons why Mr. Candy and he took those cases. That sort of thing did not happen nowadays, and it was interesting to measure the resultant saving in life. It was not perhaps entirely owing to conscious treatment, but partly to the demands for beds in a hospital that they did not keep patients in bed longer than was absolutely necessary. It was possible that the motive for emptying the beds had had a thoroughly sound effect on the chance of recovery in fracture cases. In the old days there did not seem to have been nearly so much pressure on the space; so the people came in with a fracture and stopped in bed for months, which was not, in most cases, good for them. He was very sorry that the results of the analysis were not more interesting, but he hoped he had made good the case as to the grounds for bringing forward a Paper of this kind at the Statistical Society.

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[1] The apothecary of the early days; the title of resident medical officer was first used in 1854.

The PRESIDENT announced that, as the result of the ballot, M. Lucien March and Dr. Robert Meyer had been elected Honorary Fellows.

The following candidates were elected Fellows of the Society:—

G. Palgrave Barker, B.A. (Camb.).
J. W. S. Callie.
E. T. F. Crowe.
Drummond Drummond Fraser.
G. H. Griffin.
Arthur Maxwell.
Giorgio Mortara.
A. W. Oke.
M. I. Trachtenberg, B.A.
C. Morgan Webb.

MISCELLANEA.

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I.—*Industrial Insurance.*

IN a supplement (No. II, 1911. Tübingen, J. C. B. Möhr. Price 4 marks) to the *Archiv für Sozialwissenschaft und Sozialpolitik*, Dr. P. A. Söhner discusses "Die Private Volksversicherung, ihr Wesen und ihr Wert," describing the working of the German insurance societies carrying on that form of insurance which is familiar in England through the operations of the "Prudential," and criticising their methods of working. With the greater part of his valuable contribution we are not here concerned, but there are certain statistics embodied in his work which are of general interest, and these are here reproduced.

Industrial or popular insurance in Germany dates from 1856, and there are now 17 societies engaged therein which in 1907 had 6,402,153 policies in force carrying insurances amounting to about 59,851,000*l*., figures which lag far behind the 26,858,618 policies in force in England in the same year for 267,470,000*l*. The average amount of a policy in Germany is thus 9·35*l*., and in England 9·96*l*., and has fallen in Germany from over 10*l*. in 1896. Two of the German companies, the Victoria with 3,027,372 policies for 30,672,000*l*., and the Friedrich Wilhelm with 2,362,869 policies for 16,912,000*l*., cover 84 per cent. of the policies and 79·5 per cent. of the total sum insured.

Not only are the policies taken out, as their amount shows, by the poorer classes of the community, but they mostly run for ten or fifteen years, serving as a means of saving to cover certain normal expenses of life, such as education, military service, &c. The economic weakness of the insurers shows itself most vividly in the great number of policies which lapse, because after the first enthusiasm of insurance is over the small benefit promised is outweighed by the pressure of other claims or by inability to pay arising from illness or unemployment. In the six years, 1902-07, 2,295,266 policies lapsed, or 43 per cent. of the 5,275,428 new policies entered into in that time. The insurance so dropped amounted to 26,655,000*l*., but part of the policies were converted into assurances corresponding to the amounts already paid.

The following table gives the experience of the Victoria from its commencement in 1892 down to 1907. It relates, not to the number of policies, but to the amount insured. The total amount of the new insurances taken up in a year and remaining in force at the end of that year is denoted by 100, and the following figures in the horizontal lines show what percentage of that total remains in existence at the end of each following year. No distinction is made between policies which have matured and those which have lapsed, and those sums are not taken into account which have expired in the course of the calendar year denoted. Dr. Söhner observes that for the first nine years, at least, few policies expire through death, and still fewer through maturity.

	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
1892	100	81·9	75·7	73 3	71.3	68·0	66·3	64·5
'93	—	100	85·7	80·8	77·7	75·1	72·6	70·8
'94	—	—	100	86·3	81·9	78·2	76·0	73·1
'95	—	—	—	100	82·8	78·3	74·7	71 6
'96	—	—	—	—	100	80·0	76·1	71·6
'97	—	—	—	—	—	100	80·8	76·3
'98	—	—	—	—	—	—	100	80·8
'99	—	—	—	—	—	—	—	100

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
1892	63·4	62·2	57·5	56·4	55·5	54·6	51·7	19·9
'93	69·4	68·0	66·1	47·2	45·2	42·1	40·0	36·0
'94	71·4	69 9	68·4	66·0	42·1	39·5	35·2	31·9
'95	69·2	67·4	65·7	64·4	62·2	38·5	35·8	31·3
'96	68·0	65·5	63·5	62·0	60·9	58·6	31·8	29·0
'97	71·2	67·8	65·0	63·3	62·0	60·8	58 3	30·7
'98	77·0	71·1	66·9	64·4	62·6	61·2	60·1	57·4
'99	82·4	78·2	71·9	67·8	65·4	63·4	62·0	60·8
1900	100	83·2	79·5	73·3	69·5	66·8	65·0	63·4
'01	—	100	83·1	79·4	73·5	69·6	67·2	65·4
'02	—	—	100	80·3	76·2	70·4	66·9	64·6
'03	—	—	—	100	79·7	75·3	69·9	66·5
'04	—	—	—	—	100	79·8	76·0	70·6
'05	—	—	—	—	—	100	80·5	76·4
'06	—	—	—	—	—	—	100	80·7
'07	—	—	—	—	—	—	—	100

These figures show heavy drops after ten and after fifteen years on account of the maturing of policies, and would appear to prove that between 1892 and 1907 the ten-year policy was becoming more popular. It is also noteworthy that after the first two years the prospect of life of a policy is much higher. H.W.M.

II.—*Prices of Commodities in* 1910.

By A. Sauerbeck.

The following table shows the course of prices of forty-five commodities during the last twenty years as compared with the standard period of eleven years, 1867-77, which in the aggregate is equivalent to the average of the twenty-five years 1853-77 (see the Society's *Journal*, 1886, pp. 592 and 648, and 1893, pp. 220 and 247):—

Summary of Index Numbers. Groups of Articles, 1867-77 = 100.

	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver.*	Wheat Harvest.†	Average Price of Consols.‡	Average Bank of England Rate.‡
1891	75	81	71	77	76	59	69	68	**72**	74·1	108	$95\frac{3}{4}$	$3\frac{3}{10}$
'92	65	84	69	73	71	57	67	65	**68**	65·4	91	$96\frac{3}{4}$	$2\frac{5}{10}$
'93	59	85	75	72	68	59	68	65	**68**	58·6	90	$98\frac{1}{2}$	$3\frac{1}{10}$
'94	55	80	65	66	64	53	64	60	**63**	47·6	106	101	$2\frac{1}{10}$
'95	54	78	62	64	62	52	65	60	**62**	49·1	91	$106\frac{1}{4}$	2
1896	53	73	59	62	63	54	63	60	**61**	50·5	112	111	$2\frac{5}{10}$
'97	60	79	52	65	66	51	62	59	**62**	45·3	97	$112\frac{1}{4}$	$2\frac{6}{10}$
'98	67	77	51	68	70	51	63	61	**64**	44·3	116	111	$3\frac{1}{4}$
'99	60	79	53	65	92	58	65	70	**68**	45·1	109	107	$3\frac{3}{4}$
1900	62	85	54	69	108	66	71	80	**75**	46·4	95	$99\frac{1}{2}$	4
1901	62	85	46	67	89	60	71	72	**70**	44·7	103	94	$3\frac{3}{4}$
'02	63	87	41	67	82	61	71	71	**69**	39·6	110	$94\frac{1}{2}$	$3\frac{3}{10}$
'03	62	84	44	66	82	66	69	72	**69**	40·7	101	$90\frac{3}{4}$	$3\frac{3}{4}$
'04	63	83	50	68	81	71	67	72	**70**	43·4	90	$88\frac{1}{4}$	$3\frac{3}{10}$
'05	63	87	52	69	87	72	68	75	**72**	45·7	110	$89\frac{3}{4}$	3
1906	62	89	46	69	101	80	74	83	**77**	50·7	112	$88\frac{1}{4}$	$4\frac{1}{4}$
'07	69	88	48	72	107	77	78	86	**80**	49·6	113	84	$4\frac{9}{10}$
'08	70	89	48	72	89	62	73	74	**73**	40·1	108	86	3
'09	71	89	50	73	86	64	76	75	**74**	38·9	113	$83\frac{3}{4}$	$3\frac{1}{10}$
'10	65	96	54	74	89	73	81	81	**78**	40·5	104	81	$3\frac{7}{10}$
Average													
1901-10....	65	88	48	70	89	69	73	76	**73**	43·4	106	88	$3\frac{6}{10}$
1890-99....	61	80	63	68	71	56	66	64	**66**	55·8	103	$103\frac{1}{2}$	3
'78-87...	79	95	76	84	73	71	81	76	**79**	82·1	97	$99\frac{1}{2}$	$3\frac{2}{10}$

* Silver 60·84*d.* per oz. = 100.

† Wheat harvest in the United Kingdom to 1895, 29 bushels = 100, from 1896, 30 bushels = 100.

‡ Consols and bank rate actual figures, not index numbers; consols $2\frac{3}{4}$ per cent. from 1889, $2\frac{1}{2}$ per cent. from April, 1903.

The index number of all commodities was 78 last year, or four points higher than in 1909. It was 22 per cent. *below* the standard period 1867-77, but 7 per cent. *above* the average of the last ten years, and 18 per cent. *above* the average of the lowest decade on record, 1890-99 (average index number 66).

Corn was lower on the average than in the year before, but animal food and sugar and coffee were higher. There was a small rise for minerals, particularly due to tin, but the rise for textiles extended to most sorts, principally cotton, flax, jute and wool. Among "sundry materials" higher prices were paid for linseed, palm oil and tallow.

The monthly fluctuations were as follows:—

February,	1895....	60·0	February,	1909 ...	71·9	June,	1910....	76·9
July,	'96....	59·2	December,	,, ...	76·3	July,	,, ...	78·1
,,	1900....	76·2	January,	1910....	77·1	August,	,, ...	78·2
December,	'01....	68·4	February,	,, ...	78·1	September,	,, ...	77·6
May,	'07....	82·4	March,	,, ...	79·1	October,	,, ...	77·2
December,	,, ...	76·2	April,	,, ...	78·5	November,	,, ...	77·8
,,	'08....	72·3	May,	,, ...	78·2	December,	,, ...	77·9

The monthly index number does not show any important variation. A fall took place in the middle of the year, which, however, was soon recovered, and at the end it stood 2 per cent. higher than a year ago.[1]

Taking articles of food and materials separately, the index numbers compare thus (1867-77 = 100 in both cases):—

	Average.			Feb., 1895.	July, 1896.	July, 1900.	May, 1907.	Feb., 1909.	Dec., 1909.	Dec., 1910.
	1878-87.	1890-99.	1901-10.							
Food	84	68	70	63·8	60·0	71·2	73·5	70·8	72·0	71·3
Materials	76	64	76	57·0	58·6	79·8	88·9	72·6	79·4	82·8

Articles of food are about 1 per cent. lower, but materials are 4 per cent. higher than at the end of last year.

The position of the six separate groups of commodities at the end of the last three years in comparison with whole periods is illustrated by the following index numbers (1867-77 = 100 in each case):—

	Average.			Dec., 1908.	Dec., 1909.	Dec., 1910.	Last Year, per Cent.
	1878-87.	1890-99.	1901-10.				
Vegetable food, corn, &c.	79	61	65	68·0	68·5	63·9	fall 7
Animal food (meat and butter)	95	80	88	85·6	87·0	91·0	rise 4½
Sugar, coffee, and tea	76	63	48	47·0	52·7	51·7	fall 2
Minerals	73	71	89	87·9	90·6	91·1	rise 0½
Textiles......................	71	56	69	60·1	71·0	76·1	,, 7
Sundry materials........	81	66	73	75·3	78·4	82·4	,, 5

Corn declined in April, and kept on a lower level to the end of the year, while meat rose till July and declined afterwards, though prices remained higher than in 1909. Sugar was worth nearly 15*s.* per cwt. at the beginning of August, but had a sharp decline to barely 9*s.* in view of an exceptionally large beet crop. Coffee, on the other hand, rose considerably in the second half of the year, the London standard from 31*s.* per cwt. to 52*s.*, and tea was also better during the last few months. Iron had no movements of importance, and coal was somewhat weaker in the second half. Copper declined from 61¾*l.* per ton to 56*l.*, but tin rose from 153*l.* per ton to 175*l.* Lead was comparatively low throughout the year. Cotton kept on a high level during the whole twelve months, and sold at about 8*d.* per lb. for middling American. Wool had not many fluctuations, but declined at the end. Manila hemp was cheap, but jute and flax rose. Among "sundry materials" it was principally linseed oil which ruled very high. Hides were dear, and tallow and palm oil advanced. Remarkable movements occurred in india-rubber, the price rising from 3*s.* per lb. for Para in 1908 to 7*s.* 7*d.* at the end of 1909, and to 12*s.* 5*d.* in April, 1910, and declined again to 5*s.* 6*d.*

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[1] In January, 1911, the index number was 78·5, and in February, 78·6.

*Quarterly Movements of Prices.**

Summary of Index Numbers, 1867-77 = 100.

Years.	Quarters.	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver.†
1903....	IV	61·7	81·7	45·1	65·6	80·3	67·9	69·9	72·1	**69·3**	43·8
'04	I	63·7	79·9	45·3	65·8	82·0	74·0	69·5	74·2	**70·7**	42·8
	II	62·9	84·7	48·1	67·8	79·9	70·2	66·9	71·4	**69·9**	42·0
	III	63·5	85·8	50·1	68·9	79·5	70·5	66·8	71·3	**70·3**	43·7
	IV	63·4	83·4	55·3	69·1	84·7	68·4	67·6	72·5	**71·0**	45·2
'05	I	62·6	85·7	58·6	70·3	85·6	67·9	67·0	72·3	**71·5**	44·6
	II	63·1	88·4	53·0	70·3	83·9	69·7	68·5	73·0	**71·9**	43·8
	III	61·9	87·9	47·9	68·6	87·0	74·9	67·9	75·2	**72·4**	45·8
	IV	62·9	86·6	46·1	68·1	94·1	75·5	70·8	78·5	**74·1**	48·8
'06	I	62·1	89·6	45·3	68·7	96·7	76·5	72·1	80·1	**75·3**	49·7
	II	63·8	89·0	45·1	69·2	99·1	81·3	72·7	82·5	**76·8**	50·3
	III	61·3	89·3	46·5	68·5	101·4	80·1	73·3	83·0	**76·9**	50·7
	IV	61·7	87·9	47·0	68·1	110·5	80·4	76·6	86·9	**78·9**	53·0
'07	I	64·0	88·7	46·7	69·5	112·2	80·0	78·8	88·2	**80·2**	51·5
	II	69·7	88·7	48·0	72·1	112·6	79·8	80·0	88·7	**81·7**	50·6
	III	70·1	89·1	49·1	72·7	106·5	76·8	77·5	85·1	**79·9**	51·9
	IV	73·8	87·0	48·2	73·3	95·9	71·2	76·5	80·1	**77·2**	43·3
'08	I	71·7	88·9	49·1	73·3	92 0	64·9	73·8	76·0	**74·9**	42·0
	II	71·1	90·0	50·0	73·7	87·7	62·6	71·7	73·2	**73·4**	40·3
	III	68·2	90·3	47·2	71·9	88·4	61·7	71·7	7	**72·6**	39·3
	IV	67·8	85·1	47·0	69·8	88·5	61·0	74·3	73·1	**72·2**	37·7
'09	I	69·3	85·2	48·7	70·8	85·5	60·2	74·4	74·0	**72·1**	38·5
	II	76·1	91·1	49·6	76·0	84·9	62·8	75·5	73·0	**74·9**	39·9
	III	70·6	90·6	49·9	73·6	86·5	67·4	75·3	74·1	**74·9**	39·0
	IV	67·9	88·2	52·8	72·2	88·2	70·3	77·6	75·9	**75·7**	38·9
'10	I	68·6	95·0	54·6	75·4	90·8	71·4	79·5	88·2	**78·1**	39·1
	II	64·2	98·8	55·2	75·1	88·1	72·3	80·1	70·0	**77·9**	40·7
	III	64·6	98·1	53·5	74·6	87·5	72·4	81·7	89·9	**78·0**	40·5
	IV	63·7	90·6	50·0	70·7	90·1	76·0	82·9	80·4 2·7	**77·6**	41·8

* The four quarterly figures of each year do not in all cases exactly (in the decimals) agree with the annual averages, as the latter are partly calculated from revised figures. See also the Society's *Journal*, 1893, p. 221; 1895, p. 144; 1901, p. 90; and 1909, p. 70.

† Silver 60·84*d.* per oz. = 100.

The quarterly numbers show the average of the three monthly figures, and by thus eliminating minor fluctuations they give a more trustworthy comparison of the gradual changes of the various groups of commodities. While the grand total shows very little alteration, vegetable food experienced a falling tendency, and sugar also after August. Animal food was very high till the latter part of the year. Minerals were greatly influenced by the movements of tin, and textiles and sundry materials followed a rising course.

The following figures show in each case the average index numbers of all the forty-five commodities for ten years (see the dotted line in the diagram of the *Journal*, 1886, and also the *Journal*, 1893, p. 220); they give the best picture of the gradual movement of the *average* prices of *whole periods*, as the ordinary fluctuations are still further obliterated :—

1818-27 = 111
'28-37 = 93
'38-47 = 93
'48-57 = 89
'58-67 = 99
'68-77 = 100
'78-87 = 79

1888- 97 = 67
'89- 98 = 66
'90- 99 = 66
'91-1900 = 66
'92- '01 = 66
'93- '02 = 66
'94- '03 = 66

1895-1904 = 67
'96- '05 = 68
'97- '06 = 70
'98- '07 = 71
'99- '08 = 72
1900- '09 = 73
'01- '10 = 73

The decade 1890-99 was the lowest on record more closely calculated, and since 1894-1903 the average rose from 66 to 73, or about 11 per cent.

Silver was affected by the higher duty in India, but better prices were paid in the autumn, and it rose to $26\frac{1}{4}d.$ per oz. in October. The prices and index numbers were as follows (60·84*d.* per oz. being the parity of 1 gold to $15\frac{1}{2}$ silver = 100) :—

	Price.	Index Number.		Price.	Index Number.
	d.			*d.*	
Average 1890-99 ...	34	= 55·8	*Lowest* Nov., 1902	$21\frac{11}{16}$	= 35·6
,, 1901-10	$26\frac{3}{8}$	= 43·4	End Dec., 1904 ...	$28\frac{3}{8}$	= 46·6
,, 1893	$35\frac{5}{8}$	= 58·6	,, Dec. '06	$32\frac{5}{16}$	= 53·1
,, 1908	$24\frac{3}{8}$	= 40·1	,, Dec. '08 ...	$23\frac{3}{16}$	= 38·1
,, '09	$23\frac{11}{16}$	= 38·9	,, Dec. '09	$24\frac{1}{4}$	= 39·9
,, '10	$24\frac{5}{8}$	= 40·5	,, Dec. '10	$25\frac{1}{16}$	= 41·2

Gold.—The production was estimated :—

	£	
1881-85	21,000,000	(average).
'86-90............	23,000,000	,,
'91-95	33,000,000	,,
'96-1900 ...	53,000,000	,,
1901- '05 ..	66,000,000	,,
'06	82,000,000	
'07	84,000,000	
'08	90,000,000	
'09	93,000,000	(rough estimates).
'10	93,000,000	

The *Rate of Discount* in the three principal markets is shown in the following table :—

[Per cent. and two decimals.]

	London.		Paris.		Berlin.		Average of the Three Markets.	
	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.
	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.
1895	2·00	0·80	2·10	1·59	3·14	2·02	2·41	1·47
1900	4·00	3·70	3·25	3·17	5·33	4·41	4·19	3·76
'05	3·00	2·61	3·00	2·10	3·82	2·85	3·27	2·52
'06	4·25	3·98	3·00	2·72	5·15	4·04	4·13	3·58
'07	4·90	4·49	3·47	3·40	6·03	5·12	4·80	4·34
'08	3·00	2·23	3·04	2·25	4·76	3·52	3·60	2·67
'09	3·10	2·26	3·00	1·79	3·93	2·87	3·34	2·31
'10	3·70	3·10	3·00	2·44	4·35	3·57	3·68	3·04

The average rates in 1895 were the lowest on record, those in 1907 the highest since 1873. Last year's averages were slightly higher than in the preceding year, the average bank rate being $\frac{1}{3}$ per cent. up and the average market rate nearly $\frac{3}{4}$ per cent.

Review of the year.—The past year showed a considerable improvement in European trade, although some branches, such as the iron and coal trades, did not participate to a full extent, and several others were greatly influenced by speculation. This country, notwithstanding adverse circumstances, public mourning, political affairs and labour troubles, had an enormous increase in the external trade, which rose from 1,094,000,000*l.* in 1909 to 1,212,000,000*l.* in 1910 (bullion omitted). Much of the rise is naturally due to higher values, but quantities also take a considerable share in it, nearly one-half. In the United States, on the other hand, general trade was in a depressed condition.

The average index number for the last ten years was slightly over 73 (against 66 in the lowest decade from 1890-99), but if we take the last five years only the average is over 76 against 62 in the five lowest years from 1894-98. This would mean an average rise of about 23 per cent., and there is no doubt that the great gold production has raised the general level of prices, and that the former low rates must for the present be dismissed for any comparison. These higher prices have not only raised the general prosperity, but have helped to develop in a marvellous degree a number of oversea countries, such as South America, South Africa, Australia, and the Far East.

The position in the East shows a considerable improvement, if only the outbreak of the plague in Manchuria can be kept under control. The United States shows a turn for the better, money is cheaper, and in the absence of any financial or political difficulties the prospects for this year must be considered favourable.

The arithmetical mean of the forty-five index numbers, which is 78 in 1910, 74 in 1909, 73 in 1908, and 80 in 1907, has been subjected to the usual test of using the same index numbers of the separate articles, but calculating each article according to its importance in the United Kingdom on the average of the years 1904-06. In this case the average is 77·7 against 74·9 in 1909, 74·2 in 1908, and 77·4 in 1907. It will be seen that the weighted average is even slightly higher than in 1907.

The price movements of the external trade of this country—total imports into the United Kingdom and exports of British and Irish produce—were as follows, 1873 called 111 in accordance with my index number (see the Society's *Journal*, 1905, p. 146):—

	Total Imports into United Kingdom and Exports of British and Irish Produce.			Ratio of Values. 1873 = 111.	
	Declared Value.	Value at Prices of Preceding Year.*	Values at Prices in 1873.	British Trade.	My Arithmetical Index Numbers.
	Mln. £'s.	Mln. £'s.	Mln. £'s.		
1873	626·0	—	626	111·0	111
'89	675·3	664·5	1,005	74·6	72
'99	749·7	724·7	1,241	67·1	68
1901	802·7	836·9	1,256	70·9	70
'02	812·4	831·9	1,302	69·3	69
'03	833·8	826·5	1,323	69·9	69
'04 ...	852·2	847·0	1,345	70·3	70
'05	895·3	889·6	1,408	70·6	72
'06 ...	983·7	940·9	1,480	73·8	77
'07 ...	1,072·1	1,023·5	1,540	77·3	80
'08	970·4	1,010·1	1,451	74·2	73
'09	1,003·1	1,010·4	1,511	73·7	74
'10	1,109·0	1,057·7	1,593	77·3	78

* According to the valuable calculations of the *Economist*.

The third column at uniform prices shows the movements of quantities. After some reduction in 1908 and 1909 the total last year was about 5½ per cent. greater than in 1909, and about 3½ per cent. greater than in 1907. Since 1873 there is a total increase in the external trade of 154 per cent. The ratio of values was 77·3, or the same as in 1907. Taking exports alone, last year's quantity was about 10 per cent. more than in the preceding year.

Construction of the Tables.

The Table of *Index Numbers* is based on the average prices of the eleven years 1867-77, and the index numbers have been calculated in the ordinary arithmetical way; for instance, English wheat:—

	s.	*d.*	
Average, 1867-77....	54	6	= 100, average point.
,, '55	74	8	= 137, or 37 per cent. above the average point.
,, 1910	31	8	= 57, ,, 43 ,, below ,,

The index numbers therefore represent simple percentages of the average point.

Certain articles which appear to have something in common have been grouped together, with the following result:—

		Example for 1910.	
		Total Numbers.	Average.
1. Vegetable food, corn, &c. (wheat, flour, barley, oats, maize, potatoes, and rice)	With 8 Index Nos.	522	65
2. Animal food (beef, mutton, pork, bacon, and butter)	,, 7 ,,	671	96
3. Sugar, coffee, and tea	,, 4 ,,	214	54
1—3. *Food*	,, 19 ,,	1,407	74
4. Minerals (iron, copper, tin, lead, and coal)	,, 7 ,,	622	89
5. Textiles (cotton, flax, hemp, jute, wool, and silk)	,, 8 ,,	587	73
6. Sundry materials (hides, leather, tallow, oils, soda, nitrate, indigo, and timber)	,, 11 ,,	890	81
4—6. *Materials*	,, 26 ,,	2,099	81
General average	,, 45 ,,	3,506	78

The *general average* is drawn from all forty-five descriptions, which are treated as of equal value, and is the simple arithmetical mean as shown above.

*Average Prices of Commodities.**

No. of Article	0	1	2	3	4	5	6	7	8	1—8	9	10
		Wheat.		Flour.	Barley.	Oats.	Maize.	Potatoes.*	Rice.	Vegetable Food.	Beef.‡	
Year.	Silver.†	English Gazette.	American.	Town Made White.	English Gazette.	English Gazette.	American Mixed.	Good English.	Rangoon Cargoes to Arrive.		Prime.	Middling.
	d. per oz.	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per sack (280 lbs.).	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per qr.	*s.* per ton	*s.* and *d.* per cwt.	Total.	*d.* per 8 lbs.	*d.* per 8 lbs.
396	$30\frac{3}{4}$	26·2	29	25	22·11	14·9	15	55	6·2	—	45	34
'97	$27\frac{9}{16}$	30·2	34·6	30	23·6	16·11	$14\frac{3}{4}$	70	6·9	—	47	36
'98	$26\frac{15}{16}$	34	37	33	27·2	18·5	$17\frac{3}{4}$	82	7·2	—	46	36
'99	$27\frac{7}{16}$	25·8	30	$26\frac{1}{2}$	25·7	17	18	70	7·2	—	49	40
00	$28\frac{1}{4}$	26·11	31·6	$27\frac{1}{2}$	24·11	17·7	$20\frac{1}{4}$	78	7·4	—	51	42
01	$27\frac{3}{16}$	26·9	30	$26\frac{1}{2}$	25·2	18·5	$22\frac{1}{4}$	78	6·7	—	49	42
02	$24\frac{1}{16}$	28·1	30·6	26	25·8	20·2	25	69	6·2	—	54	47
03	$24\frac{3}{4}$	26·9	31	27	22·8	17·2	22	84	7·3	—	48	42
04	$26\frac{3}{8}$	28·4	33·6	$28\frac{1}{2}$	22·4	16·4	$21\frac{1}{2}$	90	6·7	—	48	42
05	$27\frac{13}{16}$	29 8	34	$28\frac{1}{2}$	24·4	17·4	23	65	6·9	—	47	40
06	$30\frac{7}{8}$	28·3	32·6	$26\frac{1}{2}$	24·2	18·4	22	67	7·3	—	47	40
07	$30\frac{3}{16}$	30·7	36	29	25·1	18·10	$24\frac{1}{2}$	88	8·3	—	49	42
08	$24\frac{3}{8}$	32	37·6	$31\frac{1}{2}$	25·10	17·10	$26\frac{3}{4}$	81	7·7	—	52	45
09	$23\frac{11}{16}$	36·11	41·6	$34\frac{1}{2}$	26·10	18·11	$27\frac{1}{2}$	66	7·1	—	52	45
10	$24\frac{5}{8}$	31·8	36·6	31	23·1	17·4	$23\frac{3}{4}$	72	7·3	—	54	48
erage												
01-10....	$26\frac{3}{8}$	30	$34\frac{1}{4}$	29	$24\frac{1}{2}$	18	$23\frac{3}{4}$	76	$7\frac{1}{8}$	—	50	$43\frac{1}{2}$
90-99 ...	34	$28\frac{1}{2}$	$31\frac{1}{2}$	$27\frac{1}{2}$	$25\frac{1}{2}$	$17\frac{1}{2}$	$19\frac{1}{2}$	72	$6\frac{3}{4}$	—	47	$37\frac{1}{2}$
78-87....	50	40	$43\frac{1}{2}$	$34\frac{1}{2}$	$31\frac{1}{2}$	21	25	102	8	—	$55\frac{1}{2}$	46
67-77....	$58\frac{1}{2}$	$54\frac{1}{2}$	56	46	39	26	$32\frac{1}{2}$	117	10	—	59	50
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.											
96	50·5	48	52	54	59	57	46	47	62	425	76	68
97	45·3	55	62	65	60	65	45	61	67	480	80	72
98	44·3	62	66	72	70	71	55	70	72	538	78	72
99	45·1	47	54	58	66	65	55	60	72	477	83	80
00	46·4	49	56	60	64	68	62	67	73	499	86	84
01	44·7	49	54	58	65	71	68	67	66	498	83	84
02	39·6	52	54	56	66	78	77	59	62	504	92	94
03	40·7	49	55	59	59	66	67	72	72	499	81	84
04	43·4	52	60	62	57	63	66	77	66	503	81	84
05	45·7	55	61	62	62	67	71	56	67	501	80	80
06	50·7	52	58	58	62	70	68	57	73	498	80	80
7	49·6	56	64	63	64	72	75	75	82	551	83	84
8	40·1	59	67	69	66	69	82	69	76	557	88	90
9	38·9	68	74	75	69	73	85	56	71	571	88	90
0	40·5	57	65	67	59	67	73	62	72	522	92	96

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* The annual prices are the averages of twelve monthly or fifty-two weekly quotations; atoes of eight monthly quotations, January to April and September to December.

† Index numbers of silver as compared with 60·84*d.* per ounce being the parity between gold silver at 1 : $15\frac{1}{2}$; not included in the general average.

‡ Meat (9—13), by the carcase, in the London meat market.

Average Prices of Commodities—Contd.

No. of Article	11	12	13	14	15	9—15	16A	16B	17	18A*	18B*	18
	Mutton.		Pork.	Bacon.	Butter.		Sugar.			Coffee.		
Year.	Prime.	Mid-dling.	Large and Small, Average.	Water-ford.	Fries-land, Fine to Finest.	Animal Food. Total.	British West Indian Refining.	Beet, German, 88 p. c., f.o.b.	Java, Floating Cargoes.	Ceylon Planta-tion, Low Mid-dling.†	Rio, Good.	Mean of 18A and 18B.
	d. per 8 lbs.	*d.* per 8 lbs.	*d.* per 8 lbs.	*s.* per cwt.	*s.* per cwt.		*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	
1896	53	39	35	50	98	—	10¾	10½	12½	95	58	—
'97	55	41	44	59	94	—	9¼	8⅞	11	95	40	—
'98	52	37	45	58	95	—	9½	9½	11¾	92	32	—
'99	54	41	40	51	103	—	10½	10	12¼	90	31	—
1900	59	45	44	60	102	—	11¼	10½	12¾	75	40	—
1901	54	44	49	63	105	—	9¼	8½	10¾	70	35	—
'02	55	44	48	63	102	—	7¼	6¾	8½	70	31	—
'03	58	47	44	60	100	—	8½	8¼	9¾	70	30	—
'04	59	50	39	57	102	—	10¼	10¼	11½	75	37	—
'05	59	51	46	65	107	—	11	11¼	12¾	75	40	—
1906	60	53	49	65	110	—	8½	8⅝	10	75	39	—
'07	60	54	45	63	108	—	9	9½	10⅞	75	31	—
'08	58	52	43	62	114	—	9¾	10½	11½	66†	31	—
'09	52	46	49	71	112	—	10¼	11	12¼	70	35	—
'10	58	52	54	75	114	—	11	12¾	13¼	69	42	—
Average												
1901–10....	57½	49½	46½	64½	107	—	9½	9¾	11	71	35	—
1890–99....	54½	41½	42½	59	100	—	11½	11½	13¾	98	62	—
'78–87....	64½	53	49	71	116	—	17	18	21½	78	52	—
'67–77....	63	55	52	74	125	—	23	24	28½	87	64	—

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

Year	11	12	13	14	15	9—15	16A–16B	17	18A*	18B*	18
									*	*	
1896	84	71	67	68	78	512	46	44	109	91	100
'97	87	75	85	80	75	554	39	39	109	64	86
'98	84	67	87	78	76	542	40	41	106	50	78
'99	86	75	77	69	82	552	44	43	103	48	75
1900	94	82	85	81	82	594	46	45	86	63	74
1901	86	80	94	85	84	596	38	38	80	55	67
'02	87	80	92	85	82	612	30	30	80	48	64
'03	92	85	85	81	80	588	36	34	80	47	63
'04	94	91	75	77	82	584	44	40	86	58	72
'05	94	93	88	88	86	609	47	45	86	62	74
1906	95	96	94	88	88	621	36	35	86	61	73
'07	95	98	87	85	86	618	39	38	86	48	67
'08	92	95	83	84	91	623	43	40	76	48	62
'09	83	84	94	96	90	625	45	43	80	55	67
'10	92	95	104	101	91	671	51	47	79	66	72

* Index numbers not included in the general average.
† East India good middling from 1908.

Average Prices of Commodities—Contd.

No. of Article	19A*	19C*	19B*	19	16—19	1—19	20A	20B	21	22	—	23
	Tea.						Iron.			Copper.		Tin.
Year.	Congou, Common. *d.* per lb.	Indian Good Medium. *d.* per lb.	Average Import Price. *d.* and dec. per lb.	Mean of 19A and 19B.	Sugar, Coffee, and Tea. Total.	Food. Total.	Scotch Pig. *s.* and *d.* per ton	Cleveland (Middlesbrough) Pig. *s.* and *d.* per ton	Bars, Common. £ per ton	Chili Bars. £ per ton	English Tough Cake. £ per ton	Straits. £ per ton
1896	4	7½	9·55	—	—	—	46·10	38·2	5	47	50	60
'97	4	7⅜	9·36	—	—	—	45·4	40·7	5¼	49	52	62
'98	4½	6½	9·13	—	—	—	47·2	42·2	5½	52	55	72
'99	5½	7¼	8·82	—	—	—	63·9	60·1	7¼	74	78	123
1900	5¼	6⅜	8·58	—	—	—	69·4	69·3	9	73	77	134
1901	4	5¾	7·67	—	—	—	53·9	45·5	6½	66	71	118
'02	3¾	5¾	7·20	—	—	—	54·6	49·3	6⅛	53	57	121
'03	4¼	6½	7·71	—	—	—	52·3	46·3	6¼	58	62	127
'04	5	6⅜	7·24	—	—	—	51·5	43·3	6⅛	59	63	127
'05	4¼	5¾	7·24	—	—	—	53·6	49·6	6½	70	74	143
1906	4	5¾	7·40	—	—	—	58·9	53·0	7¼	88	92	181
'07	5¼	7	8·13	—	—	—	63·6	55·7	7½	87	92	172
'08	5¼	6⅞	7·96	—	—	—	56·1	50·5	6¾	60	64	133
'09	5	7⅛	8·16	—	—	—	55·1	49·3	6½	59	62	135
'10	4½	7¼	8·22	—	—	—	56·1	50·1	6½	57	61	155
Average 1901-10....	4½	6⅜	7¾	—	—	—	55½	49½	6⅝	65½	70	141
1890-99....	4⅝	7½	9¾	—	—	—	47	41½	5½	50	53	81
'78-87....	6¾	—	12¾	—	—	—	46	38	5½	55	60	89
'67-77....	11¼	—	17¼	—	—	—	69	60	8¼	75	81	105

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

Year	19A*	19C*	19B*	19	16—19	1—19	20A	20B	21	22	—	23
	*		*									
1896	36	—	56	46	236	1,173	68	—	61	63	—	57
'97	36	—	54	45	209	1,243	66	—	64	65	—	59
'98	40	—	53	46	205	1,285	68	—	67	69	—	69
'99	49	—	51	50	212	1,241	92	—	88	99	—	117
1900	47	—	50	49	214	1,307	100	—	109	97	—	128
1901	36	—	44	40	183	1,277	78	—	79	88	—	112
'02	33	—	42	38	162	1,278	79	—	74	71	—	115
'03	38	—	44	41	174	1,261	76	—	76	77	—	121
'04	44	—	42	43	199	1,286	74	—	74	79	—	121
'05	38	—	42	40	206	1,316	80	—	79	93	—	136
1906	36	—	43	40	184	1,303	86		88	117	—	172
'07	47	—	47	47	191	1,360	92		91	116	—	164
'08	47	—	46	46	191	1,371	82		82	80	—	127
'09	44	—	47	46	201	1,397	81		79	79	—	129
'10	40	—	48	44	214	1,407	82		79	76	—	148

* Index numbers not included in the general average.

Average Prices of Commodities—Contd.

No. of Article	24	25A	25B	26	20—26	27	28	29A	29B	30A	30B	31
	Lead.	Coal.				Cotton.		Flax.		Hemp.		Jute.
Year.	English Pig.	Wallsend Hetton in London.	Newcastle Steam.	Average Export Price.	Minerals. Total.	Middling American.	Fair Dhollerah.	St. Petersburg.	Russian, Average Import.	Manila Fair Roping.	St. Petersburg Clean.	Good Medium.
	£ per ton	*s.* per ton	*s.* per ton	*s.* and dec. per ton		*d.* per lb.	*d.* per lb.	£ per ton	£ per ton	£ per ton	£ per ton	£ per ton
1896	$11\frac{1}{2}$	15	8	8·85	—	$4\frac{11}{32}$	$3\frac{3}{32}$	26	27	$17\frac{1}{2}$	25	$12\frac{1}{4}$
'97	$12\frac{5}{8}$	$15\frac{3}{4}$	$8\frac{1}{4}$	8·98	—	$3\frac{29}{32}$	$3\frac{1}{32}$	$24\frac{1}{2}$	27	16	25	11
'98	$13\frac{1}{4}$	$16\frac{3}{4}$	$10\frac{3}{4}$	9·92	—	$3\frac{5}{16}$	$2\frac{1}{2}$	24	$25\frac{1}{2}$	27	25	11
'99	$15\frac{3}{8}$	$18\frac{1}{2}$	12	10·72	—	$3\frac{9}{16}$	$2\frac{3}{4}$	23	$24\frac{1}{2}$	41	27	$12\frac{1}{2}$
1900	$17\frac{1}{4}$	$23\frac{1}{2}$	$17\frac{1}{2}$	16·75	—	$5\frac{15}{32}$	$4\frac{3}{16}$	35	30	39	28	$14\frac{1}{4}$
1901	$12\frac{3}{4}$	20	$12\frac{1}{2}$	13·86	—	$4\frac{3}{4}$	$3\frac{15}{32}$	38	$39\frac{1}{2}$	37	27	$12\frac{3}{4}$
'02	$11\frac{3}{8}$	$18\frac{1}{2}$	$11\frac{1}{4}$	12·29	—	$4\frac{27}{32}$	$3\frac{11}{16}$	32	37	43	27	$12\frac{1}{4}$
'03	$11\frac{3}{4}$	$16\frac{1}{2}$	$10\frac{1}{2}$	11·70	—	6·03	$4\frac{1}{8}$	32	36	36	27	$13\frac{1}{2}$
'04	$12\frac{1}{4}$	$16\frac{1}{4}$	$9\frac{1}{2}$	11·13	—	6·60	5	36	$38\frac{1}{2}$	38	28	14
'05	$14\frac{1}{4}$	$15\frac{1}{2}$	$9\frac{1}{4}$	10·56	—	5·09	$4\frac{5}{32}$	32	35	$39\frac{1}{2}$	29	$18\frac{1}{2}$
1906	$17\frac{1}{2}$	$16\frac{1}{2}$	$10\frac{1}{2}$	10·90	—	5·95	$4\frac{13}{16}$	33	37	$41\frac{1}{2}$	31	$23\frac{1}{2}$
'07	$19\frac{1}{2}$	$19\frac{3}{4}$	$14\frac{1}{2}$	12·75	—	6·55	$4\frac{7}{16}$	30	34	35	31	21
'08	$13\frac{7}{8}$	18	12	12·77	—	5·72	$4\frac{5}{16}$	23	$29\frac{1}{2}$	$24\frac{1}{2}$	28	$15\frac{1}{2}$
'09	$13\frac{1}{2}$	$17\frac{1}{2}$	11	11·30	—	6·33	$4\frac{7}{8}$	28	$32\frac{1}{2}$	$24\frac{1}{2}$	28	13
'10	$13\frac{1}{4}$	$17\frac{1}{4}$	$10\frac{1}{2}$	11·72	—	8·00	6	35	37	23	30	$14\frac{3}{4}$
Average												
1901–10....	14	$17\frac{1}{2}$	$11\frac{1}{8}$	$11\frac{7}{8}$	—	$5\frac{7}{8}$	$4\frac{1}{2}$	32	$35\frac{1}{2}$	34	$28\frac{1}{2}$	$15\frac{3}{4}$
1890–99....	12	$17\frac{1}{2}$	$10\frac{3}{8}$	$10\frac{3}{8}$	—	$4\frac{1}{4}$	3	27	$27\frac{1}{2}$	$26\frac{1}{2}$	25	$12\frac{1}{2}$
'78–87....	14	$16\frac{3}{4}$	$8\frac{5}{8}$	9	—	6	$4\frac{1}{4}$	33	34	$35\frac{1}{2}$	$26\frac{1}{2}$	15
'67–77....	$20\frac{1}{2}$	22	$12\frac{1}{2}$	$12\frac{1}{2}$	—	9	$6\frac{3}{4}$	46	48	43	35	19

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

Year.	24	25A	25B	26	20—26	27	28	29A–29B	30A–30B	31
1896	56	68	—	71	444	48	46	56	55	64
'97	62	72	—	72	460	43	45	55	53	58
'98	65	76	—	79	493	37	37	52	67	58
'99	75	84	—	86	641	40	41	51	87	66
1900	84	107	—	134	759	61	62	69	86	75
1901	62	91	—	111	621	53	51	82	82	67
'02	55	84	—	98	576	54	55	74	90	64
'03	57	75	—	94	576	67	61	72	81	71
'04	60	74	—	89	571	73	74	79	85	74
'05	70	70	—	84	612	57	62	71	88	97
1906	85	75	—	87	710	66	71	74	93	124
'07	95	90	—	102	750	73	66	68	85	111
'08	68	82	—	102	623	64	64	56	67	82
'09	66	80	—	90	604	70	72	64	67	68
'10	65	78	—	94	622	89	89	77	68	78

Average Prices of Commodities—Contd.

No. of Article	32A	32B	33	34	27—34	35A	35B	35C	36A	36B	37A	37B
	Wool.			Silk.		Hides.			Leather.		Tallow.	
Year.	Merino, Port Phillip Average Fleece. d.* per lb.	Merino, Adelaide, Average Grease. d. per lb.	English, Lincoln Half Hogs. d. per lb.	Tsatlee. s. per lb.	Textiles. Total.	River Plate, Dry. d. per lb.	River Plate, Salted. d. per lb.	Average Import. d. and dec. per lb.	Dressing Hides. d. per lb.	Average Import. d. per lb.	St. Petersburg, Y.C. s. per cwt	Town. s. per cwt.
1896	13	6⅜	11½	10½	—	6¾	5½	4·89	13½	13⅛	48	21
'97	12¼	6	9⅝	10¼	—	6½	5½	4·93	13½	12¾	40	20
'98	13¼	6⅝	8¾	10½	—	7	6⅛	5·04	13½	13⅜	40	22
'99	17¼	8½	8¼	13	—	7⅜	6¼	4·94	13½	13½	—	25
1900	15¾	7⅞	7⅞	13	—	8⅛	6¼	5·31	14	13⅜	—	27½
1901	13	6⅜	6⅞	10½	—	7½	6	5·34	14	13½	—	28
'02	15	7⅝	6¼	11	—	7⅝	6⅜	5·52	14	14½	—	32½
'03	16	8¼	7¼	13½	—	8	6½	5·75	14	15½	—	29½
'04	16	8	10⅛	12½	—	8¼	6¾	5·66	14	15	—	26½
'05	17¼	8¾	12⅜	12¾	—	9	7¼	5·98	14	15¼	—	26½
1906	18	9¼	13⅜	13¾	—	10	7¾	6·52	16½	16	—	30½
'07	18	9⅜	12¼	15¼	—	9¾	7⅝	6·98	16	17⅞	—	34½
'08	15¾	7⅞	8½	10½	—	8¼	5⅞	6·30	14½	17¼	—	30½
'09	17¾	9¼	9	9¾	—	9¼	7	6·73	15	17¼	—	30½
'10	18¼	9⅝	9⅞	10¼	—	9¾	7⅝	7·15	16	17½	—	35½
Average												
1901–10....	16½	8½	9⅝	12	—	8¾	6⅞	6¼	14¾	16	—	30½
1890–99 ...	13½	6½	10	11½	—	6¼	5½	5	13¼	13¾	43	25
'78–87 ...	18½	8⅜	11¾	15	—	8⅝	6¾	6½	15	17	41	35½
'67–77....	21¼	9⅞	19¾	23	—	9	7	6⅞	16	18¾	45	45

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

Year	32A	32B	33	34	27—34	35A	35B	35C	36A	36B	37A	37B
1896	62		58	46	435	77		—	84	—	77	
'97	59		49	45	407	75		—	84	—	67	
'98	64		44	46	405	82		—	84	—	69	
'99	83		42	57	467	85		—	84	—	56	
1900	76		40	57	526	90		—	87	—	61	
1901	62		35	46	478	84		—	87	—	62	
'02	72		32	48	489	87		—	87	—	72	
'03	78		37	59	526	91		—	87	—	65	
'04	77		51	54	567	94		—	87	—	59	
'05	84		63	55	577	95		—	84	—	59	
1906	87		68	60	643	103			94		68	
'07	88		62	66	619	105			97		77	
'08	76		43	46	498	90			91		68	
'09	87		46	42	516	100			93		68	
'10	90		51	45	587	106			96		79	

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* Port Phillip fleece washed nominal since 1895, exactly in proportion with the value of clean wool.

Average Prices of Commodities—Contd.

No. of Article	38	39	40A	40B	41	42	43	44	45A	45B	35—45	20—45	1—45
	Oil.			Seeds	Petroleum.*	Soda.		Indigo.	Timber.				
Year.	Palm.	Olive.	Linseed.	Linsecd.	Refined.	Crystals.	Nitrate of Soda.	Bengal, Good Consuming.	Hewn, Average Import.	Sawn or Split, Average Import.	Sundry Materials. Total.	Materials. Total.	Grand Total.
	£ per ton.	£ per tun.	£ per ton.	s. per qr.	d. per gall.	s. per ton	s. per cwt.	s. per lb.	s. per load.	s. per load.			
1896	22	30	17½	33	5½	42	8	4¼	40	44	—	—	—
'97	22	31	15	33	4¾	51	7¾	4	41	47	—	—	—
'98	23	32	16¾	36	5⅛	54	7¾	3½	42	47	—	—	—
'99	25	33	20	40	6¼	56	7¾	3½	40	49	—	—	—
1900	27½	36	30½	54	6¾	62	8	3½	41	56	—	—	—
1901	26	38	30	53	6½	65	9	3⅜	39	52	—	—	—
'02	27½	34	28	50	6¼	64	9¾	3¼	39	51	—	—	—
'03	28	33	21	39	6¼	64	9¾	3¼	39	54	—	—	—
'04	27½	32	16	33	6⅛	64	10¼	2⅞	36	51	—	—	—
'05	27	36	18	39	5⅝	64	11	2⅞	38	51	—	—	—
1906	30½	39	20¾	43	6⅛	64	11¼	3	40	55	—	—	—
'07	33	43	23½	44	6¾	64	11¼	3¼	40	57	—	—	—
'08	27½	43	22¼	45	6¾	61	10½	3⅜	36	53	—	—	—
'09	29	50	24¾	49	6⅜	61	10¼	3¼	34	54	—	—	—
'10	35	47	38½	66	6	61	9¾	3⅛	36	57	—	—	—
Average													
1901-10....	29	39½	24¼	46	6¼	63	10¼	3⅛	37½	53½	—	—	—
1890-99....	24½	35	19¼	38	5⅛	53	8¼	4⅜	40	45	—	—	—
'78-87....	32½	40	23	46	6⅞	62	12½	6	47	47	—	—	—
'67-77....	39	50	30	60	12½*	92	14	7¼	60	54	—	—	—
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.												
1896	56	60	56		* 44	46	57	59	74		690	1,569	2,742
'97	56	62	53		38	56	55	55	77		678	1,545	2,788
'98	59	64	59		41	59	55	48	78		698	1,596	2,881
'99	64	66	67		50	61	55	48	78		714	1,822	3,063
1900	71	72	94		54	67	57	48	85		786	2,071	3,378
1901	67	76	92		52	71	64	47	80		782	1,881	3,158
'02	71	68	87		50	70	70	45	79		786	1,851	3,129
'03	72	66	67		50	70	70	45	82		765	1,867	3,128
'04	71	64	54		49	70	73	40	76		737	1,875	3,161
'05	69	72	63		45	70	79	40	78		754	1,943	3,259
1906	78	78	71		49	70	80	41	83		815	2,168	3,471
'07	85	86	75		54	70	80	45	85		859	2,228	3,588
'08	71	86	75		54	66	75	46	78		800	1,921	3,292
'09	74	100	82		51	66	73	45	77		829	1,949	3,346
'10	90	94	116		48	66	70	43	82		890	2,099	3,506

* Petroleum as compared with the average from 1873-77 only.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Report of an inquiry by the Board of Trade into the earnings and hours of labour of workpeople in the United Kingdom.* No. V. *Agriculture in* 1907. [Cd-5460.]

This report, although coming as the fifth of the general series of these official inquiries, is the third statement compiled by the Board of Trade dealing separately with the remuneration of agricultural labour. Its predecessors supplied information for 1898 and 1902 respectively; and in recalling these publications we cannot but miss the note of practical insight into the conditions of an intricate problem which distinguished these and all other matter from the pen of our lamented colleague, Mr. Wilson Fox. The 1907 data now before us must be acknowledged, however, to have been drawn from a wider field than was available five years before. Mr. Askwith tells us he draws his figures from returns showing the payments on 15,800 farms to over 78,000 able-bodied male labourers, whereas the units relied on as types in 1902 were but 4,600, and the workpeople accounted for but 37,000. The advance is welcome, but the statistician cannot help being wary of founding conclusions on what is still a relatively slender total of types. It may not unnaturally be suspected that the places reported on are generally of a higher order than the average range of farms, and one would have liked to see a better response to the 45,400 schedules issued, and to have "roped in" a much larger and more varied aggregate of the 900,000 labourers who were found in 1901 on the farms of the United Kingdom. It is sad that in comparing the figures employed in this latest return—which only sees the light within a few weeks of the next decennial census—we have to go ten years back for a total which these types represent. In this respect the nation, which is not yet convinced of the need of more frequent enumerations, itself must bear the blame, though we may with some reason impute rather to the dilatory work of the Stationery Office than to the zealous officers of the Board of Trade the gratuitous gap of four years between the gathering of these latest particulars and their reaching the hands of the public. For those classes which can be compared the earnings of agricultural labour are shown to have continued to rise.

For 9 per cent. of the English labourers, and about 3 per cent. of the Irish total, but apparently for the more respectable proportion of 22 per cent. of the Scottish workers we have, however, a most useful statement of wages and of earnings in all forms. The distinction is again very clearly shown in these tables between the remuneration in cash and in kind above the normal wage, with board and lodging where it is provided. Summarised under each grade of workers recognised in the census, when the various periods of hiring and modes of payment are combined and reduced to show average weekly earnings, the totals are as under for England and for Scotland :—

Class of men.	England.		Scotland.	
	s.	*d.*	*s.*	*d.*
Ordinary labourers	17	6	18	11
Horsemen	18	9	19	8
Cattlemen	19	1	19	4
Shepherds	19	7	20	5
All classes	18	4	19	7

Elsewhere, it appears, the whole four forms of occupation cannot be distinguished. Thus for Wales (with which is here included Monmouthshire) only a general average of 18*s.* is forthcoming. For Ireland the mean weekly earnings, without grade or class, are put at no more than 11*s.* 3*d.* per week.

Taken in groups of counties within England itself, the variation in earnings, for the single and larger class of ordinary labourers, ranges from 19*s.* 2*d.* in the northern counties to 16*s.* 10*d.* in the south-west. In the case of "horsemen" and "cattlemen" the range is greater still. In shepherds there is a difference of no less than 5*s.* 2*d.* between the aggregate pay of a shepherd in the north and in the south-west. There is a wealth of material in the accompanying "county" tables well worth analysis in detail, and they suggest that such enquiries furnish matter for a study of the whole question of the varying cost of production, so far as manual labour is concerned, in the shape of a reasoned statistical paper, on which, in the scope of a mere review, it is impossible to enter. The task is one which may be commended to any statistician familiar not only with these records, but with the governing varieties of farming practised in the districts of high and of low wages respectively. These varieties, as well as the local conditions prevailing near industrial and mining centres which are here alluded to, lie at the root of many of the differences here shown.

Perhaps, too, when we have a new census to start from the investigation might take a wider range, and the effect on the level of the pay obtained by able-bodied males by the presence or absence of an extensive resort to female labour and casual workers should not be overlooked. Thus the higher remuneration secured by the 83,000 male workers in Scotland has doubtless its explanation both in the better organisation of farming work, in the more efficient and smaller staff on a given acreage, and in the supplementary resource of something like 40,000 female workers, half of whom were earning wages. In England the labour force is quite differently composed, the 609,000 male workers had as auxiliaries in 1901 less than 12,000 wage-paid female workers and 18,600 assisting female relatives.

P.G.C.

2.—*Répertoire technologique des noms d'industries et de professions—français, anglais, allemands—avec notices descriptives sommaires.* Paris: Berger-Levrault et Cie., 1909. Price 30 francs.

Comparison of the results of occupational and industrial censuses in different countries must always be a matter of great difficulty, but that difficulty will be materially lessened by the above work of M. Lucien March and his colleagues of the French Statistical Office. This volume, which must represent the fruit of an amount of co-ordinated work such as could only be carried out by a great statistical department, was undertaken at the instance of the International Statistical Institute, which at its session at Copenhagen in 1907 appointed a committee to deal with the matter. This committee was fortunate enough to secure the services of the French Statistical Office and of its distinguished chief, and so promptly was the work carried out, by the aid of a large number of collaborators in France, England, Germany and other countries, that proofs of the completed work were approved by the twelfth session of the Institute, held in Paris two years later.

The work takes the form of (1) a primary classification of industries in French, English and German; and (2) a secondary classification of the trade processes and handicrafts involved in the manufacture of each product dealt with, or in the fishing, agricultural, mining, and transport industries, which complete the subject-matter of the book. The occupational terms used are given in French, English, and German, but the explanatory text is in French only. In addition to this systematic classification full indexes are given in the three languages, and these form a most valuable feature of the work.

The primary classification of workers by the products of their industry is in conformity with the views approved by the International Statistical Institute in London in 1905. In it the French census list, which classifies workers by industries, appears to have been closely followed. This method of procedure has much in its favour, from the point of view of convenience in compilation, since it can be carried out in an orderly and logical manner. There is no great difficulty in classifying workers by the products of their industry without taking count of the nature of the work done by each individual, whereas it appears absolutely impossible to classify by the nature of the work done without taking into account that of the finished product. It is easy, for instance, to distinguish between makers of matches and makers of tinplates; but when we attempt to classify by processes carried out we find "dipping" common to both, as well as to many other industries, but so various in its nature in these different industries that match dipping is a totally different occupation from tinplate dipping. Consequently, the framer of a classified list of modern occupations is confronted by the difficulty that if his list is not to be inordinately lengthy it must in practice become in great part industrial rather than occupational. This has been the experience of those responsible for the list of occupations in the English census reports. Those portions of it dealing with the largest industries, such as agriculture, the building trade and some others, are entirely, or at least mainly, occupational in plan, but those dealing with the very diverse manufacturing industries are mainly industrial, classifying by the finished product, though in some instances, *e.g.*, furniture making, we find both systems in use side by side.

On the other hand, it must be said in favour of the English system of classifying as far as possible by occupations rather than by industries, that for some most important purposes, *e.g.*, the study of occupational mortality, this is the nature of analysis required. On the whole, it would seem that a fully satisfactory classification of occupations must be complex in conformity with the complexity of modern industry. This is the solution of the difficulty which was arrived at by Mr. Coghlan in reporting on the last census in New South Wales, and it is the solution offered by the secondary classification in M. March's work.

In view of the inconsistency in the English census classification noted above, it is somewhat consolatory to observe, that although from the preface one would gather that M. March's secondary classification, or subdivision of each industrial heading, was intended to be purely occupational, enumerating and explaining the various individual "métiers" and professional specialities carried on in each branch of industry, this idea has not been consistently carried out in practice. Thus, although needle makers, for instance, are subdivided according to the various processes concerned in making needles, makers of tools and of musical instruments are subdivided according to the various tools and instruments made, and not the processes concerned. None the less the work is a most valuable one, and it will be found of the utmost service to all engaged in the compilation or study of tables of industries and occupations.

T.H.C.S.

3.—*Land problems and national welfare.* By Christopher Turnor. 344 pp. London: John Lane, The Bodley Head, 1911. Price 7*s.* 6*d.*

At a time when the land problems of the United Kingdom are admittedly many and serious, this volume makes a forcible plea for a more comprehensive treatment of agricultural policy and a closer examination of agricultural possibilities than is usually accorded to such topics in this country. To the attention of the thinking public Mr. Turnor's book is commended by Lord Milner's brief introduction, in words which deserve a hearing as coming from a shrewd administrator accustomed to weigh the relative importance of political problems and to measure the limits of effectively applying political ideals to the methods of practical government. Without endorsing all the personal opinions advanced by the author, Lord Milner concurs in asking for the restoration to a foremost place in any really national policy of a more definite, consistent and continuous "land tradition" than is exhibited in the spasmodic legislative efforts with which one political party or another has faced isolated agricultural problems. It is obvious that the scope of the arguments employed by Mr. Turnor necessarily carries one far beyond any normal applications of the numerical method, and of necessity leads the reader into regions of current debatable politics and parliamentary tactics. Into these matters a purely statistical journal cannot with advantage enter. On the other hand, we may gladly offer a general assent to the wisdom of critically enquiring, as Mr. Turnor sets out to do, whether the net results of our native agricultural methods, and the extent of the utilisation of British soil, are satisfactory, or whether they leave something to be desired. The author furnishes from his own experience a considerable body of evidence concerning the wide variation in the productive capacity of British farms, and suggests many drastic changes. Although no eulogist of a purely spade husbandry he wants smaller units of production and ownership. In the frankness of the criticisms applied impartially to his fellow landowners, to the ordinary type of farmers, and to the average run of labourers who compose our agricultural community, he offers a fairly wide target to the controversialist. He will rouse, too, a note of legitimate criticism when he depreciates the relative success of what he calls the "star farmer" as tending to an optimistic impression respecting our aggregate volume of production. Nevertheless, many students of rural economy will heartily follow the author when he asks for greater help from the State, for the setting up of more practical educational methods and for the better organisation of the rural population. Nearly all will agree with him as to the need of further inviting the aid of science in developing agricultural production, and when he insists on the advantages that might follow the adoption of better methods of marketing and the disposal of crops. We will listen also, with every disposition to conviction, when Mr. Turnor illustrates the grounds of his belief as to the room which is still open in a densely populated State like the England of our day for a wider resort to intensive over extensive modes of farming, and when he disputes the wisdom of the tendency to abandon arable culture for inferior grass husbandry. It is, however, in this connection, when the writer passes from the recorded successes of particular farms and peculiarly favoured systems, or results secured on narrow areas, to general deductions that one finds defects in the method of treatment. More especially when he draws very wide comparisons respecting the relative production of entire States, and presses, with the aid of figures requiring much dissection, contrasts by no means favourable to the British producer. Here the volume borders on the domain of the statistician, but fails to exhibit the statistician's caution. One cannot help regretting that while the defects of the available figures are in terms admitted, the consequences of relying on doubtful data have not been more fully realised.

When once the limited records, such as they are, that we possess respecting the relative average yield of particular crops per acre in different countries are passed over as not strictly comparable, or are set aside as authoritative standards of comparison in favour of huge totals of assumed national production, one cannot repress a suspicion that either more or less should have been done. Wide guesses of the aggregate net outturn of vastly complicated systems of agricultural production presented in millions of pounds sterling without detail or explanation of the particular mode of compilation are not convincing, and they lead the calculator surely to exchange a certain if not completely satisfactory pathway of investigation for very treacherous ground indeed. One is unwilling to question the use of broad statements in a treatise designed to arrest public attention, but one would like to know much more than Mr. Turnor gives us of the basis for the startling statement that Belgium with only 4,000,000 cultivated acres "produces"—in the opinion of its inspector general of agriculture—no less than 80,000,000*l*. of foodstuffs, while Denmark, so lauded elsewhere in these pages, on 7,000,000 acres produces only half as much, or 40,000,000*l*. annually. Again, our own country, with twelve times the Belgian area, is credited with getting only two and half times the Belgian total output. The Belgian farmer is here said to get 20*l*. out of each cultivated acre and the British farmer something under 4*l*. At the risk of expanding the size of his book one would have desired to see the writer face the question of how each total was constructed, and how far the dates of the valuations agreed, and whether the principles on which the three estimates mentioned above, as well as the French and German figures, were framed were really identical. Of all international comparisons aggregate net production is the most difficult to tabulate. The British estimate which is quoted is no doubt that of Mr. Rew, and we know precisely how that is limited to sales off farms to other persons than farmers. Ideas of gross and net produce vary widely, and in comparing different farming systems, cultivation of crops for sale or for local consumption have to be distinguished. Relative imports and exports of agricultural produce are also an element not to be left out of any calculations of the feeding power of one country's agriculture over that of another. On this point one instinctively doubts the very large development of crop production at home which the writer counts upon as possible, and the quotations from Herr von Zelter's figures respecting German and English food production are open to obvious challenge. Mr. Turnor has referred to the valuable data which Sir R. F. Crawford put before the Royal Statistical Society in 1899 so far as concerns his estimates of the home areas required to furnish a national equivalent for our own vast food imports. Some other sections of the same paper—such as bring out the excess of the Belgian cereal imports per head even over those of our own country—should have suggested to the author a further line of enquiry to be pursued before some of the totals here employed as comparable were with any confidence insisted on. Even in the case of Denmark alone, it would have been interesting to make a close investigation of the raw produce imported as a balance to the noted butter and bacon exports of that energetic little state. The book before us will, however, do good if it stimulates a closer statistical examination of the net results of land production under differing economic conditions, and if we agree with Mr. Turnor that there are features wherein Belgium and Great Britain, on grounds of their similar density of population, are not unfit for comparison, the student will find in the exhaustive treatise of Mr. Rowntree, here freely quoted in certain connections, a very uninviting account indeed of the relative conditions of the Belgian agricultural worker, to be set against his success in extracting, with great labour and intensive cultivation, a very remarkable outturn. P.G.C.

4.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Bellom (*Maurice*). Les retraites des ouvriers mineurs en Belgique. 44 pp., 8vo. Paris: H. Dunod and E. Pinat, 1910.

[A report on the origin and present state of provident funds for workers in mines in Belgium, and on pending changes in their constitution.]

Birot (*Jean*). Statistique annuelle de géographie comparée, 1910. 1. Population. 2. Agriculture, Industrie. 3. Commerce. 4. Finances, Forces militaires. 6^e^ année. 32 pp., 8vo. Paris: Hachette and Co., 1910.

[A compilation of recent general statistics of the principal countries of the world.]

Bourgin (*Hubert*). Le Socialisme et la concentration industrielle. 88 pp., 8vo. Paris: Rivière and Co. Price 0 fr. 75.

[A short study from the Socialistic point of view of present industrial conditions, and of the growing industrial concentration taking place in different countries, with its effects on the community.]

Bray (*F. E.*). British Rights at Sea under the Declaration of London. 99 pp., sm. 8vo. London: P. S. King and Son, 1911. Price 1*s.* net.

Keynes (*Margaret N.*). The problem of boy labour in Cambridge. 23 pp., 8vo. Cambridge: Bowes and Bowes, 1911. Price 3*d.* net.

[A short study of the conditions of employment of boys in Cambridge after leaving school, especially in regard to their future. Though much of the prosperity of the town is due to the University, its influence as regards the boys is not wholly beneficial, because it gives opportunity for an unusual amount of street trading, odd jobs, errand work, mostly of a seasonal nature.]

Laporte (*P.*). Étude sur les causes de l'infériorité des ports de commerce français. Extrait de la Revue Maritime, Août 1910. 65 pp., 8vo. Paris: R. Chapelot and Co., 1911.

[The author finds that there is a certain correlation between the economic conditions of a country and the activity of its seaports, and that while good means of communication between the interior of the country and its ports are of importance for the existence of the latter, the nature of the goods transported has also an important bearing on the question.]

Leener (*G. de*). Le Commerce au Katanga: Influences Belges et Etrangères. Missions dans le Katanga 1. Instituts Solvay. Travaux de l'Institut de Sociologie. Actualités Sociales. xviii + 143 pp., sm. 8vo. Brussels: Misch and Thron, 1911. Price 3 francs.

[A study, on the spot, of the commercial resources of Katanga and of its relations with Rhodesia and the other adjoining countries. The author deals with the question of the different European nationalities engaged in the development of those countries, and with the future of Rhodesia.]

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* See also "Additions to the Library," page 444, *sqq.*

Levasseur (*E.*). Histoire du Commerce de la France. Première partie: Avant 1789. xxxiii + 611 pp., 8vo. Paris: A. Rousseau, 1911. Price 12 fr. 50 c.

[The author has been collecting and compiling the material for this work during the past forty years. There are, he points out, many works dealing with different phases of the commerce of France, but no complete connected history of its internal and external trade from earliest times to the present. The author hopes to fill this void, and the present volume is the first instalment of his work, which is to be completed in a second volume, the preparation of which is already well advanced.]

Mahaim (*Ernest*). Les abonnements d'ouvriers sur les lignes de chemins de fer belges et leurs effets sociaux. Instituts Solvay. Travaux de l'Institut de Sociologie. Notes et Mémoires. Fasc. 11. 259 pp., la. 8vo. Brussels: Misch and Thron, 1910. Price 20 francs.

[A study of the social effects of the facilities given by the Belgian railways for cheap workmen's tickets. These effects are far reaching, and on the whole benefit both employees and employers. The author finds that they tend to diminish overcrowding in towns, and that they have a levelling effect on wages in town and country.]

Mangold (*George B.*). Child problems. xv + 381 pp., 8vo. New York: Macmillan Co., 1910. Price 5*s.* 6*d.* net.

[An endeavour to give a general view of the principal social child problems of the present time as they are found in the United States. The author deals with his subject under the heads of: 1. Infant and child mortality. 2. Recent aspects of educational reform. 3. Child labour. 4. The delinquent child. 5. The dependent and neglected child. There are, in addition, a selected bibliography and an index.]

Monkswell (*Lord*). French Railways. xii + 114 pp., 8vo. London: Smith, Elder and Co., 1911. Price 3*s.* 6*d.* net.

[An interesting and readable account, with illustrations, of the management and working of railways in France and of their relations with the State.]

Payer (*André*). La participation aux bénéfices. Étude historique, critique, et documentaire. 104 pp., 8vo. Paris: Rivière and Co., 1911. Price 0 fr. 75.

[A short historical and critical study of profit-sharing in France. The author considers his subject in relation to the capitalist and to the worker, and deals with the attitude of the Government towards it. The different forms of profit-sharing and its adaptability to different industries are also considered.]

Sturge (*Mary D.*) and *Horsley* (*Sir Victor*). On some of the Biological and Statistical errors in the work on parental alcoholism by Miss Elderton and Prof. Karl Pearson, F.R.S. 29 pp., 8vo. London: British Medical Association, 1911.

Wehberg (*Hans*). Capture in War on land and sea. Translated from "Das Beuterecht im Land- und Seekriege," with an introduction by Mr. John M. Robertson, M.P. xxxv + 210 pp., 8vo. London: P. S. King and Son, 1911. Price 5*s.* net.

[An historical account of the law of prize on land and sea, with suggestions for its reform. There is a bibliography and index.]

Chile. Anuario estadistico de la Republica de Chile. Año 1909. Tomos 1—3. 3 vols., 8vo. 1910.

Germany. Jahrbuch für Sozialen Fortschritt und Freiheitliche Weltanschauung. Reformers' Yearbook. Guide Social. Herausgegeben von Dr. Hermann Hasse. Erster Jahrgang 1910-11. 8vo. Leipzig: Felix Dietrich, 1911. Price 2 marks.

Customs Refunds on Re-Exports (British and Foreign). Summary of British and Foreign Regulations respecting the Refund of Customs Duties paid on Imported Goods which are subsequently re-exported without entering into local consumption. [Cd-5456.] 30 pp., fol. London: Wyman and Son, 1910. Price 3*d.*

Education. Public Elementary Schools (England and Wales). (Numbers on Admission Registers.) (338.) 1910.

Port of London Authority. Copy of first annual report for year ended March 31, 1910. (318.) 25 pp., fol. London: Wyman and Son, 1910. Price 4½*d.*

"Colliery Guardian." Review of the coal trade in 1910. xvi + 151 pp., 8vo. London: "The "Colliery Guardian" Co., 1911.

[A reprint in convenient form of articles in the *Colliery Guardian* dealing with the coal industry during the past year. It is a record of the course of the coal trade as shown by changes in prices, freights, contract allotments, &c. The effects of the Eight Hours Act are also considered.]

Tariff Commission. The proposed reciprocal trade arrangement between Canada and the United States of America. 38 pp., 4to. 1911.

CURRENT NOTES.

The trade returns for the past month are again satisfactory. As compared with February, 1910, there is an increase of 4,918,448*l.*, or 9·6 per cent., in imports and an increase of 3,961,250*l.*, or 12·5 per cent., in exports. Re-exports show a decrease of 190,404*l.*, or 1·8 per cent. The figures for the twelve months ending February, 1911, are summarised in the subjoined tables:—

[000's omitted.]

Exports.	Twelve months ending February, 1911.	Twelve months ending February, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	26,781,	23,673,	+ 3,108,
II. Raw materials and articles mainly unmanufactured	53,977,	51,647,	+ 2,330,
III. Articles wholly or mainly manufactured	348,441,	305,725,	+ 42,716,
IV. Miscellaneous and unclassified (including parcel post)	8,280,	6,802,	+ 1,478,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,201,	11,985,	+ 1,216,
II. Raw materials and articles mainly unmanufactured	62,942,	57,304,	+ 5,638,
III. Articles wholly or mainly manufactured	27,723,	24,926,	+ 2,797,
IV. Miscellaneous and unclassified (including parcel post)	214,	301,	− 87,
Total, British, foreign and colonial	541,559,	482,363,	+ 59,196,
Exports of bullion and specie	64,598,	59,197,	+ 5,401,

[000's omitted.]

Imports.	Twelve months ending February, 1911.	Twelve months ending February, 1910.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	256,368,	257,904,	− 1,536,
II. Raw materials and articles mainly unmanufactured	272,948,	217,321,	+ 55,627,
III. Articles wholly or mainly manufactured	158,297,	149,971,	+ 8,326,
IV. Miscellaneous and unclassified (including parcel post)	2,529,	2,601,	− 72,
Total merchandise	690,142,	627,797,	+ 62,345,
Imports of bullion and specie	71,869,	64,799,	+ 7,070,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending February, 1911.	Twelve months ending February, 1910.	Increase (+).
	Tons	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	42,006,	40,438,	+ 1,568,
Total, British and foreign, *cleared* with cargoes	58,098,	56,913,	+ 1,185,

Mr. Sauerbeck's index number of prices for February, 1911, is 78·6 as against 78·5 in January, the average of the eleven years 1867-77 being taken as 100. In spite of the fact that a number of articles were not quite so good as in January, the average index number is firmly maintained. Corn and coffee were a little cheaper, but mutton, pork and sugar ruled rather higher. Iron was weak, and cotton lower, while flax advanced. Linseed oil rose to over 50*s.* a ton, a price unknown during the last eighty years, but it fell again to 46*s.* Articles of food were 72·0 as compared with 71·4 in January, and materials were 83·5 as compared with 83·7. There was a slight fall in silver during the month. The *Economist* index number stands at 2,536, as compared with 2,523 at the end of January, and thus shows a rise of 13 points or ½ per cent.

According to the Board of Trade *Labour Gazette* the state of the labour market during January, 1911, was as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
January, 1911	403	753,040	29,239	3·9
December, 1910	415	700,665	34,834	5·0
January, 1910	416	694,456	47,259	6·8

Employment in January was, on the whole, better than in December, mainly owing to the improvement in the engineering and shipbuilding industries. The cotton trade continued to be well employed, but there was a slight falling off in some of the other textile trades. As compared with a year ago, most of the principal industries showed improvement, which was especially marked in the iron and steel, engineering, shipbuilding, cotton, woollen and worsted trades. Coal mining showed little change.

The seventh part of the Preliminary Tables of the Census of Production [Cd-5545. Price, 5½*d.*] has been issued. The present tables cover the production of printing and bookbinding factories and workshops, factories engaged in the printing and publishing of newspapers and other periodicals, typefounding, stereotyping, engraving, and die-sinking factories and workshops, manufactured stationery factories and workshops, cardboard-box factories and workshops, pen, pencil, and artists' materials factories and workshops, plate and jewellery factories and workshops, watch and clock factories and workshops, musical instrument factories and workshops, billiard table and sports requisites factories and workshops, toys and games factories and workshops, ivory, bone, horn, picture frame, and fancy articles factories and workshops, and photographic factories and workshops. Information is also given respecting productive work carried on in the printing and envelope factories of the General Post Office, Savings Bank Department, and in the Ordnance Survey Department. The gross output (selling value or value of work done) for private factories and workshops is 60,610,000*l.*, for General Post Office (Savings Bank Department) printing and envelope factories 9,398*l.*, and for the Ordnance Survey Department 76,670*l.*, the value of the output for private factories and workshops being calculated on a profit basis, while that of the General Post Office and the Ordnance Survey Department is calculated on the cost of production. The cost of materials used is 24,524,000l., 4,727*l.* and 12,762*l.* respectively, and the amount paid to other firms by the various private factories for work given out 1,221,000*l.* The net output, *i.e.*, the excess of the gross output over the cost of materials used and the work given out is 34,865,000*l.*, 4,652*l.*, and 63,908*l.* respectively, while the total number of persons employed (except outworkers) is 351,848, 37, and 432 respectively. In addition to these numbers, 5,407 outworkers were returned as borne on the books of the employing firms, the largest number being in the plate and jewellery trades (2,907) and in the cardboard-box trade (1,334). In the other trades the number of outworkers ranges between 23 and 380.

An appendix volume for presentation to Parliament has been issued by the Royal Commission on the Poor Laws and Relief of Distress on "Statistics relating to England and Wales." [Appendix, vol. xxv, Cd-5077. Price 11*s.* 1*d.*] This portion of the report, which covers 902 pages, deals comprehensively with the statistics of pauperism, and contains, among other matter, memoranda by the Registrar-General as to Poor Law areas and registration, notes by Professor Smart on the growth of Poor Law expenditure, a memorandum by the Board of Trade as to the amount of time lost by workpeople through want of employment and other causes, reports on insurance against invalidity, sickness, unemployment, &c., by Mr. Thomas G. Ackland, F.I.A., Mr. George King, F.I.A., F.F.A., and Mr. Francis G. P. Neison, F.I.A., &c., and memoranda as to superannuation and grants by the Board of Education and the Home Office. There are 21 tables and 11 diagrams. Less exhaustive statistical investigations relating to Scotland and Ireland respectively are contained in Appendix volumes xxx [Cd-5440. Price 1*s.* 5*d.*] and xxxi [Cd-5244. Price 5½*d.*] recently issued.

A supplement to volumes I and II of the "Annual Statement of "the trade of the United Kingdom with foreign countries and British "possessions" has been compiled by the Statistical Office of the Customs and Excise Department, and has been issued under the title "Abstract and detailed tables, showing the trade between the United "Kingdom and each foreign country and British possession according "to the system of classification in force in 1908 and previous years." [Cd-5305. Price 3*s.* 1*d.*] In the introduction to volumes I and II of the Annual Statement for 1909 it was explained that throughout the tables in those volumes imports were classified as received from the countries whence they were consigned to the United Kingdom, whereas in the issues for previous years imports were generally classified as received from the countries whence they were shipped direct to the United Kingdom, and that exports were classified according to the countries of final destination so far as known, even if those countries possessed no seaboard, whereas in earlier issues exports to such countries were credited to the country in which the port of discharge was situated. The main object of the supplementary volume is to present the classification of the imports and exports in accordance with the principles formerly adopted in the tables of volumes I and II, so that the information necessary for a comparison of the results yielded by the two methods of classification may be available for a further term of years as recommended in the Report of the Departmental Committee on Trade Records, appointed in 1908 [Cd-4345].

The third annual report of the London Traffic Branch of the Board of Trade [Cd-5472. Price 5*s.* 2*d.*], which has recently been issued, brings the record of the principal facts relating to locomotion in London down to the end of 1909 on the same lines as the two previous reports, but it contains in addition the results, so far as they can be given, of a special inquiry which the Branch was directed to make into the sufficiency of the arterial roads leading into London. In this part of the report the defects of the existing roads are set out in detail, and suggestions are made in regard to measures which it would be desirable to take with a view to make good deficiencies, and generally to bring the capacity of the main thoroughfares up to the requirements of present and prospective traffic. The inquiry, the necessity for which was pointed out in 1905 by the Royal Commission on the Means of Locomotion and Transport in London, was commenced in 1909, when the staff of the Branch was increased for the purpose. The investigation has been conducted by Colonel Hellard, C.B., who, with the assistance of Lieutenant Fishbourne, R.E., supervised the revision of the Ordnance Survey maps, collected information relating to population and areas, analysed the figures of the traffic census, and compiled tables on areas and population and on traffic.

A memorandum has been issued by the Board of Education (Circular 766) as to instruction to be given upon the Census in schools. It is suggested that the Census should form the subject of one or more special lessons in all classes for older children in public elementary schools. In the majority of evening and technical schools, it is pointed out, it will probably be sufficient to put up an enlarged copy of the schedule, which has been prepared by the Registrar-General and is circulated with the memorandum concerning it, in order that the students may have an opportunity of studying it for themselves. It is shown how the general purpose of the Census, and the way in which it is carried out, can be made clear even to young children. The Census schedule itself and the manner in which it is to be completed should be taken as the subject of one or more lessons. It may be shown why it is important, both for the locality and for the country, that the number of people of each sex in each town and in each parish should be correctly known; that it should be known how the population of the country as a whole is growing, how the population of each town and parish is increasing or decreasing, and how fast in each part of the country the urban part of the population is growing as compared with the rural part; that the birth places of the people, and especially of those who come from abroad, should be known; and that there should be accurate knowledge of the trades and occupations carried on in different parts of the country, and of the number of men and women and boys and girls engaged in the various trades and in the various branches of each trade; that the number of people living in each year of life should be known; that the number of people afflicted with blindness, deafness, &c., should be known; and that there should be complete information about the kinds of houses in which people live. It may be shown, in a general way, how accurate knowledge on such points is of very great service to those who have to watch the health of the people or to consider in what way their interests in other directions may be best promoted.

The Board of Agriculture and Fisheries have issued a memorandum, prepared by the Registrar-General, calling the attention of agriculturists to the classification in the forthcoming Census of persons engaged on farms, and giving instructions as to the terms to be used in describing the nature of the employment on the land. In view of the importance of questions relating to the number and distribution of the agricultural population, the Board express the hope that all persons concerned will render assistance to ensure that the particulars entered on the schedules by farmers and farm labourers are precise and specific, and capable of accurate arrangement in the groups to which they belong.

The will of the late Sir Francis Galton, to which reference was made in the last issue of the JOURNAL, and under which the residuary estate, amounting to about 45,000*l.*, is left to the University of London, has now been proved. The terms of the will provide for the establishment and endowment of a professorship at the said University, to be known as "The Galton Professorship of Eugenics," with a laboratory or office and library attached thereto. It is to be the duty of the Professor "to pursue the study and further the "knowledge of national eugenics—that is, of the agencies under "social control that may improve or impair the racial faculties of "future generations physically and mentally." The professor appointed by the Senate is first, to collect materials bearing on eugenics; secondly, to discuss such materials and draw conclusions; thirdly, to form a Central Office to provide information, under appropriate restrictions, to private individuals and to public authorities concerning the laws of inheritance in man, and to urge the conclusions as to social conduct which follow from such laws. Lastly, it is required that he should extend the knowledge of eugenics by all or any of the following means, namely: (*a*) professorial instruction; (*b*) occasional publications; (*c*) occasional public lectures; (*d*) experimental or observational work which may throw light on eugenic problems. He is also to submit from time to time reports of the work done to the authorities of the University.

The terms of the will do not bind the University as to the disposal of the bequest. The authorities are to be at liberty to apply either the capital or the income for any of the purposes enumerated above, but it is the hope of the testator that the University will see fit to preserve the capital wholly, or almost wholly, intact, not encroaching materially upon it for cost of buildings, fittings, or library. The University may supply the laboratory or office at such place as its Senate shall from time to time determine, but preferably in the first instance in proximity to the Biometric Laboratory. "I state these hopes," the will continues, "on the chance of their having a moral effect upon the future "decisions of the Senate of the University, but they are not intended "to have any legally binding effect whatever upon the freedom "of their action." The election of the first or any subsequent Professor of Eugenics may be postponed for a period not exceeding four years from the date of the testator's death, or from the date of the occurrence of any vacancy. The testator declares it as his wish, but does not impose it as an obligation, that the post should be offered in the first instance to Professor Karl Pearson, on such conditions as will give him liberty to continue his Biometric Laboratory at University College.

The Interstate Commerce Commission of the United States has issued its first annual report on "The Statistics of Express Companies in the United States," the period under review ending on June 30, 1909. In 1894 a partial report of the express companies was published by the Census Office in connection with its general report on transportation. In 1908 this office compiled a report based on the accounts of the companies as they were kept at that time, and this report was published by the Bureau of the Census as a bulletin, under the title "Express Business in the United States, 1907." It covered the twelve months ending June 30, 1907, but was necessarily unsatisfactory in some respects because of the lack of uniformity in the methods of accounting of the different companies. A uniform system of operating accounts was promulgated by the Commission under orders which became effective on July 1, 1908. The classifications covered by these orders were a classification of expenditure for real property and equipment, a classification of operating revenues, and a classification of operating expenses. The report now issued is the first report based on a uniform classification of revenues and expenses, and adjusted to rules of accounting similar to those promulgated by the Commission for other agencies of transportation, and for this reason, it is stated, it may be regarded as the first of a series of annual reports covering the financial conditions and current operations of the express companies in the United States.

The first two volumes have been issued of a comprehensive report, in nineteen volumes, on the "Condition of Woman and "Child Wage Earners in the United States." These volumes of the report, which is being prepared under the direction of Mr. Charles P. Neill, Commissioner of Labour, deal respectively with cotton textile industry and men's ready-made clothing. The Act of Congress authorizing the inquiry was approved in January, 1907. It provides for an investigation into the industrial, social, moral, educational and physical condition of woman and child workers in the United States wherever employed, with special reference to their age, hours of labour, terms of employment, health, illiteracy, sanitary and other conditions surrounding their occupation, and the means employed for the protection of their health, person and morals.

An article on "The New York Budget Exhibit" in the December number of the *Publications of the American Statistical Association* contains some remarks by Mr. Leonard P. Ayres on the preparation of statistical diagrams intended for public exhibition —for the information and attraction of the ordinary man and not of the professional statistician. The exhibit in question was arranged by the city administration; each tax-payer received with his tax bill an invitation to attend, and the total number of visitors was nearly a million, so that, as Mr. Ayres says, "as an opportunity "to study the psychology of a statistical exhibit designed to inform "and influence non-technical visitors, the New York Budget was "unique and unsurpassed." As such charts are not infrequently required nowadays, it may consequently be of service to quote his comments in full. "The lesson is that those who devise charts for "public exhibitions should strive to make the smallest possible "number of truly salient points in the most emphatic way. Exhibts "are weak in proportion as they are diffuse." Graphic charts made in the familiar way, with lines of different colours indicating variations on a background of ordinates, and *abscissæ* seem to be beyond the comprehension of the average visitor. This was almost invariably the case when a number of lines were shown on the same chart. On the other hand, charts made up of contrasted surfaces, series of upright columns, surfaces of frequency, and so on, seemed to be generally appreciated and understood. Charts showing two contrasted sets of data—such, for example, as "Receipts" and "Expenditure"—seemed to be well understood when the contrast was indicated by using two colours for the two sets of data, as, for example, red for "Receipts" and black for "Expenditure." It was not sufficient to indicate these contrasts by words alone; chromatic distinction was essential. Judging from his actions and comments, the "man from the street" does not understand an historical diagram, showing variations over a series of years, unless it runs from left to right like the words on the ordinary printed page. It is futile to try to get him to read up or down or backwards. Again, increases must be represented by rises in the lines or surfaces of the chart. When he reads that expenditures have gone up in amount, he wants to see on the chart that they have gone up in direction. It is hard work for him to understand it when he reads that they have gone up and sees that they have gone sideways. In lettering the charts, wording of the most positive, simple, direct sort seems to be essential. By this is meant wording consisting of positive statements in telegram style. People walking through a crowded exhibition will not stop to read an intricate statement or to examine the details of a complex chart. In a similar way, those charts seemed to be understood which avoided using decimal places in showing amounts of money and fractions of percentages. Apparently the ordinary business man does not understand a percentage figure carried out to several decimal places. In short, the use of "round numbers" seems most desirable. Charts containing reading matter only appeared to be the least effective exhibit shown. In general, the fault of these placards was that they contained too much.

In the same publication there is a useful article by Mr. Warren W. Persons on "The Correlation of Economic Statistics," pointing out the inadequacy of purely graphic methods for testing the intensity of correlation, and giving a number of illustrative problems to which the method of correlation has been applied.

It is announced that the American Economic Association, beginning with March of the present year, will issue, in place of the *Economic Bulletin*, a new quarterly to be known as the *American Economic Review*. This will contain many features of the *Economic Bulletin*, in addition to articles by well-known writers. The proceedings of the annual meeting, the handbook of the Association, and occasional monographs, will be issued as supplements to the regular number of the review. Professor Davis R. Dewey, of the Massachusetts Institute of Technology, has been elected managing editor.

We have received from Mr. S. M. Jacob, of the Indian Civil Service, a copy of his memoir "On the correlations of areas of

" matured crop and the rainfall, and certain allied problems in " agriculture and meteorology." (*Memoirs of the Asiatic Society of Bengal*, vol. ii, 1910.) The memoir is divided into three parts, Part I dealing with the interdependence of crop and rainfall for certain districts of the Punjab; Part II with the distribution of the rainfall over the year for the same districts; and Part III with the correlation between the April-September and the October-March rainfall. At the time when his memoir was written the author was unacquainted with Mr. Hooker's researches into the relation between the weather and the crops (JOURNAL, vol. lxx, page 1, March, 1907) in this country. The first section of his work is a similar inquiry of a preliminary kind for Indian conditions, but rainfall alone is taken into consideration, not rainfall and accumulated temperature as in Mr. Hooker's paper. The phrase " areas of " matured crop " is, it should be explained, a technical one; if the actual area of a field is, say, 1 acre, and the observer estimates the crop as being three-quarters of what a " normal " or " average " crop should be, the area is taken as $\frac{3}{4}$ acre of " matured crop " Particular kinds of crop are not distinguished, but the memoir discusses the correlation of the total autumn harvest with the April-September rainfall, and of the total spring harvest with the October-March rainfall; the correlations for the former range, in the selected villages of four areas chosen, from 0·30 to 0·46, and for the latter from 0·46 to 0·73. The proportions of the principal crops are by no means the same at the two harvests. A curious point comes out in the third part of the memoir. For the twenty years which form the basis of the work in Part I, there is a high correlation between the April-September and the October-March rainfall (0·49 to 0·61), but for eight stations for which longer records (forty-five to sixty years) are available, the correlations prove quite small or even negative. The twenty years first taken seem indeed to be somewhat exceptional, and a more detailed investigation suggests some tendency for periods of positive and negative correlation to alternate. In the earlier part of the paper there are some useful remarks on errors of observation in crop estimating, and their possible influence on results.

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February 25—"Electricity accounts: points of interest on": *Williams (L. R.).*

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La Réforme Sociale—

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Jahrbücher für Nationalökonomie und Statistik (*Conrad's*). *February*, 1911—Der Kursstand der deutschen Reichsanleihen und der preussischen Staatsanleihen: *Elster* (*Karl*). Die süditalienische Auswanderung und ihre volkswirtschaftlichen Folgen: *Waltershausen* (*A. Sartorius Freiherr Von.*). Beiträge zu den Gesetzen der wirtschaftlichen Phänomenologie: *Földes* (*Bela*). Böhm-Bawerks These von der Mehrergiebigkeit der kapitalistischen Produktionsumwege: *Conrad* (*Otto*). Die baugewerbliche Produktion und der Liegenschaftsverkehr in Freiburg-Baden in den Jahren 1900-10: *Poth* (*F.*). Der Gesetzentwurf betreffend Ausbau der Wasserstrassen und Erhebung von Schiffahrtsabgaben. Mit drei Abbildungen: *Geigel.*

Zeitschrift des Königlich Preussischen Statistischen Landesamts, 1910. *Abteilung* 4—Das Kapitalvermögen der preussischen Städte und grösseren Landgemeinden nach dem Stande vom 31. März 1906: *Tetzlaff* (*Dr. Oskar*). Der Viehstand in Preussen im Jahre 1909: *Petersilie* (*Dr. Erich*). Kommunalfinanzstatistische Grundsätze: *Tetzlaff* (*Dr. Oskar*).

ITALY—

La Riforma Sociale. February, 1911—Nuovi favori al siderurgici?: *Einaudo* (*Luigi*). Gli inscritti nelle universita e negli istituti superiori italiani nell diciassettennig scolastico dal 1893-94 al 1909-10: *Ferraris* (*Carlo F.*). Il saggio dell' interesse ha tendenza a rialzare?: *Borgatta* (*Gino*). Le cause reali del marasma dei mercati finanziari italiani: *Artom* (*V.*).

Rivista Italiana di Sociologia. January - February, 1911—Il monachismo occidentale e la sua storia economica: *Salvioli* (*G.*). Le scienze sociali e il metodo sperimentale: *Murray* (*R. A.*). Le classi medie: *Chessa* (*F.*).

LIST OF ADDITIONS TO THE LIBRARY.

During the month ended March 7, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Austria—

Finance. Statistische Mitteilungen über das österreichische Salzmonopol, 1907-08. La. 8vo. 1910. (The Ministry of Finance.)

Belgium—

Population. Relevé officiel du chiffre de la Population du Royaume . . . à la date du 31 Décembre 1909. 11 pp., 4to. 1910. (The Administration of General Statistics.)

Chile—

Anuario estadistico de la Republica de Chile. Año 1909. Tomos 1-3. 3 vols., 8vo. 1910. (The Central Statistical Office.)

Germany—

Inland Navigation. Verkehr und Wasserstande der deutschen Binnenwasserstrassen im Jahre 1909. Teil 1. 4to. 1911. (The Imperial Statistical Bureau.)

Berlin. Census. Weitere vorläufige Ergebnisse der Volkszählung vom 1. Dezember 1910 für die deutschen Stadte mit Statistischen Amtern. Zusammengestellt im Statistischen Amt der Stadt Berlin. 4 pp., fol. 1910. (The Municipal Statistical Bureau.)

Jahrbuch für sozialen Fortschritt und freiheitliche Weltanschauung . . . Erster Jahrgang 1910-11. 8vo. Leipzig. 1911. (M. F. Dietrich.)

Luxemburg, Grand Duchy of—

Census. Berufs- und Gewerbezählung, 1907. II Reihe. 2 Band. 8vo. 1910. (Major P. G. Craigie.)

—— Recensement professionnel et industriel, 1907. 1^{e} Série. Tome 6. 8vo. 1910. (*Id.*)

Mexico—

Cuadro sinoptico informativo de la Administration del Senor General Don Porfirio Diaz, Presidente de la Republica hasta 1909. 107 pp., la. 8vo. 1910. (The Director-General of Statistics.)

Switzerland—

Le recensement fédéral de la population du 1er décembre 1910. Résultats provisoires. 48 pp., fol. 1911. (The Federal Statistical Bureau.)

United States—

Census Bureau. Bulletin 110. Supply and Distribution of Cotton for year ending August 31, 1910. 4to. 1911. (The Bureau.)

Interstate Commerce Commission. 1st Annual Report on Statistics of Express Companies in United States for year ending June 30, 1909. 82 pp., la. 8vo. 1911. (The Commission.)

Labour. Report on condition of Women and Child Wage-Earners in the United States. In 19 volumes. Vol. 1, Cotton Textile Industry. Vol. 2, Men's Ready-made Clothing. 2 vols. 8vo. 1911. (The Department of Commerce and Labour.)

Iowa. 14th Report of Bureau of Labour Statistics for biennial period 1908-09. 8vo. 1910. (The Bureau.)

(c) United Kingdom and its several Divisions.

United Kingdom—

Accidents Committee. Report of Departmental Committee on Accidents in Places under the Factory and Workshop Acts. [Cd-5535.] 1911. (The Home Office.)

Census of Production (1907). Preliminary Tables summarising the results of the Returns received under the Act. Part VII. [Cd-5545.] 1911. (The Census of Production Office.)

Customs Refunds on Re-Exports (British and Foreign). Summary of British and Foreign Regulations respecting the Refund of Customs Duties paid on Imported Goods which are subsequently re-exported without entering into local consumption. [Cd-5456.] 1910. (Purchased.)

Industrial Property and Merchandise Marks. Papers and Correspondence relative to the recent meeting at Brussels of the adjourned Conference of the Union for the Protection of Industrial Property (in continuation of Cd-9014 of 1898). [Cd-603.] 1901. (The Foreign Office.)

Iron and Steel, 1908-09. (270.) 1910. (Purchased.)

Land Transfer Acts. Second and Final Report of the Royal Commission. [Cd-5483.] 1911. (*Id.*)

Local legislation. Special report from Select Committee. (323.) 1910. (*Id.*)

Miscellaneous. No. 4 (1910). Correspondence respecting the Declaration of London. [Cd-5418.] 1910. (*Id.*)

Publications. Report from Select Committee on Publications and Debates' Reports; with proceedings of the Committee, Minutes of Evidence, and Appendix. (315.) 1910. (*Id.*)

Poor. Royal Commission on Poor Laws and Relief of Distress. Appendix Vol. 25. Statistics relating to England and Wales. [Cd-5077.] 1911. (The Commission.)

—— Appendix Vol. 26. Documents relating more especially to the Administration of Charities. [Cd-5078.] 1910. (*Id.*)

—— Appendix. Vol. 29B. Report by Mr. Cyril Jackson on effects of Employment or Assistance given to "Unemployed" since 1886 as a means of relieving Distress outside the Poor Law in Ireland. [Cd-4890.] 1909. (*Id.*)

—— Appendix Vol. 30. Scotland. Statistical and other documents relating specially to Scotland. [Cd-5440.] 1911. (*Id.*)

—— Appendix Vol. 31. Statistics relating to Ireland. [Cd-5244.] 1910. (*Id.*)

—— Appendix Vol. 33. Foreign and Colonial Systems of Poor relief with Memorandum on the relief of famines in India. [Cd-5441.] 1910. (*Id.*) (Another copy presented by Mr. C. F. Adair Hore.)

—— Appendix Vol. 36. Some Industries employing Women Paupers. Supplement to Report (Appendix Volume XVII) by Miss Constance Williams and Mr. Thomas Jones on the effect of Outdoor Relief on Wages and the Conditions of Employment. [Cd-5200.] 1910. (The Commission.)

England and Wales—

Education. Public Elementary Schools (England and Wales). (Numbers on Admission Registers.) (338.) 1910. (Purchased.)

—— Report and abstracts of evidence taken before Departmental Committee on cost of school buildings. 8vo. [Cd-5534.] 1911. (*Id.*)

Poor. Comparative Statement of Pauperism and Cost of Relief of Poor in certain years from 1848-49 to 1909-10. [Cd-5454.] 1910. (*Id.*)

—— Report of Departmental Committee appointed by President of Local Government Board with respect to Orders relating to Administration of Out-door Relief. 1911. (*Id.*)

London. Port of London Authority. Copy of First Annual Report for year ended March 31 1910. (318.) 1910. (*Id.*)

Scotland—

Live Stock and Agriculture in Congested Districts in Scotland. Report of Departmental Committee. [Cd-5457.] 1910. (Purchased.)

(d) **Authors, &c.**

Bellom (*Maurice*). Les retraites des ouvriers mineurs en Belgique. 44 pp., 8vo. 1910. (The Author.)

Birot (*Jean*). Statistique annuelle de géographie comparée, 1910. 1. Population. 2. Agriculture, Industrie. 3. Commerce. 4. Finances, Forces militaires. 6e année. 32 pp., 8vo. Paris, 1910. (Messrs. Hachette and Co.)

Bourgin (*Hubert*). Le Socialisme et la concentration industrielle. 88 pp., 8vo. Paris, 1910. (Messrs. Rivière and Co.)

Bray (*F. E.*). British Rights at Sea under the Declaration of London. 99 pp., sm. 8vo. 1911. (Messrs. P. S. King and Son.)

Ferraris (*Carlo F.*)—

Gli inscritti nelle Università e negli istituti superiore italiani, 1893-94 al 1909-10. 16 pp., 8vo. Torino, 1911. (The Author.)

Laureati e Diplomati nelle Università e negli Istituti superiore italiani, 1904-05 al 1908-09. Nota. 24 pp., 8vo. Venezia, 1911. (*Id.*)

Galton (*S. Tertius*). Chart exhibiting the relation between amount of Bank of England notes in circulation, the rate of foreign exchanges and prices of gold and silver bullion and of wheat, with explanatory observations. [With MS. letter from Sir Francis Galton.] 32 pp. folded chart. 8vo. London, 1813. (Mr. G. Udny Yule.)

Gini (*Corrado*)—

Indici di concentrazione e di dipendenza. 152 pp., 8vo. [Rome] 1910. (The Author.)

I presupposti statistici della teoria della cernita naturale. 20 pp., 8vo. Roma, 1910. (*Id.*)

Gow, Wilson and Stanton, Ltd. Rubber Producing Companies. 4th Edition. 8vo. 1911. (The Firm.)

Keynes (*Margaret N.*). The problem of boy labour in Cambridge. 23 pp., 8vo. Cambridge, 1911. (Messrs. Bowes and Bowes.)

Laporte (*P.*). Étude sur les causes de l'infériorité des ports de commerce français. Extrait de la Revue Maritime, Août 1910. 65 pp., 8vo. 1911. (Messrs. Chapelot and Co.).

Leener (*G. de*). Le Commerce au Katanga: Influences Belges et Etrangères. Missions dans le Katanga 1. Instituts Solvay. Travaux de l'Institut de Sociologie. Actualités Sociales. xviii + 143 pp., sm. 8vo. 1911. (Professor E. Waxweiler.)

Levasseur (*E.*). Histoire du Commerce de la France. Premiere partie: Avant 1789. xxxiii + 611 pp., 8vo. Paris, 1911. (The Author.)

Mahaim (*Ernest*). Les abonnements d'ouvriers sur les lignes de chemins de fer belges et leurs effets sociaux. Instituts Solvay. Travaux de l'Institut de Sociologie. Notes and Memoires. Fasc. 11. 259 pp., la. 8vo. 1910. (Professor Emile Waxweiler.)

Mangold (*George B.*). Child problems. xv + 381 pp., 8vo. New York, 1910. (The Macmillan Co.)

Monkswell (*Lord*). French Railways. xii + 114 pp., 8vo. 1911. (Messrs. Smith, Elder and Co.)

Payer (*André*). La participation aux bénéfices. Etude historique, critique, et documentaire. 104 pp., 8vo. Paris, 1911. (Messrs. Rivière and Co.)

Rozenraad (*C.*). Table showing Imports and Exports of certain countries during 1910 and 1909. Sheet. (The Compiler.)

Schuurmann (*W. H. A. E.*). De plaatselijk werkende Brandverzekeringmaatschappijen in het Jaar 1909. 24 pp., 8vo. 1911. (The Author.)

Slosse (*A.*) et *Waxweiler* (*E.*). Recherches sur le travail humain dans l'industrie. 1. Enquête sur le regime alimentaire de 1065 ouvriers belges. Instituts Solvay. Travaux de l'Institut de Sociologie. Notes et Memoires. Fasc. 9. vi + 260 pp., la. 8vo. 1910. (Prof. Emile Waxweiler.)

Sturge (*Mary D.*) and *Horsley* (*Sir Victor*). On some of the biological and statistical errors in the work on parental alcoholism by Miss Elderton and Prof. Karl Pearson, F.R.S. 29 pp., 8vo. London, 1911. (Mr. J. M. Keynes.)

(d) Authors, &c.—*Contd.*

Turnor (*Christopher*). Land problems and national welfare. With an introduction by the Rt. Hon. Viscount Milner, G.C.B., &c. xvii + 344 pp., 8vo. London, 1911. (Mr. John Lane.)

Wehberg (*Hans*). Capture in War on land and sea. Translated from "Das Beuterecht im Land-und Seekriege," with an introduction by Mr. John M. Robertson, M.P. xxxv + 210 pp., 8vo. 1911. (Messrs. P. S. King and Son.)

(e) Societies, &c., British.

Cambridge. The Cambridge Register of Social and Philanthropic Agencies. 26 pp., 8vo. 1911. (Messrs. Bowes and Bowes.)

"Colliery Guardian." Review of the Coal Trade in 1910. xvi + 151 pp., 8vo. 1911. (Purchased.)

Tariff Commission. The proposed reciprocal trade arrangement between Canada and the United States of America. 38 pp., 4to. 1911. (The Commission.)

Tariff Reform League. Reports on Labour and Social Conditions in Germany. Vol. 3. Working Men's Tours. Nos. vi and vii. 8vo. 1911. (The League.)

PERIODICAL RETURNS.

REGISTRATION OF THE UNITED KINGDOM.

No. I.—ENGLAND AND WALES.

MARRIAGES—To 30th September, 1910.

BIRTHS and DEATHS—To 31st December, 1910.

A.—*Serial Table of* Marriages, Births, *and* Deaths, *returned in the Years* 1910-1904, *and in the* Quarters *of those Years.*

Calendar Years, 1910-1904:—*Numbers.*

Years.........	1910.	'09.	'08.	'07.	'06.	'05.	'04.
Marriages No.	—	260,544	264,940	276,421	270,038	260,742	257,856
Births........ ,,	897,100	914,472	940,383	918,042	935,081	929,293	945,389
Deaths .... ,,	483,321	518,003	520,456	524,221	531,281	520,031	549,784

Quarters *of each Calendar Year*, 1910-1904.

(I.) Marriages:—*Numbers.*

Qrs. ended last day of	1910.	'09.	'08.	'07.	'06.	'05.	'04.
March........ No.	56,331	45,094	47,548	53,017	45,478	45,173	44,968
June .... ,,	61,003	71,829	73,502	69,782	74,420	70,954	71,518
September ,,	76,502	73,843	73,785	79,129	75,949	72,811	71,271
December ,,	—	69,778	70,105	74,493	74,191	71,804	70,099

(II.) Births:—*Numbers.*

Qrs. ended last day of	1910.	'09.	'08.	'07.	'06.	'05.	'04.
March........ No.	221,707	228,787	240,112	229,287	237,427	237,826	240,513
June .... ,,	234,849	237,220	243,834	238,535	237,168	236,702	238,634
September ,,	227,196	228,840	237,229	230,528	234,663	235,352	237,666
December ,,	213,348	219,625	219,208	219,692	225,823	219,413	228,576

(III.) Deaths:—*Numbers.*

Qrs. ended last day of	1910.	'09.	'08.	'07.	'06.	'05.	'04.
March........ No.	136,421	160,506	156,328	160,020	140,451	148,291	153,347
June .... ,,	115,688	125,233	121,052	127,337	125,370	123,078	124,245
September ,,	104,174	104,786	113,929	106,813	129,397	120,882	133,694
December ,,	127,038	127,478	129,147	130,051	136,063	127,780	138,498

Annual Rates of MARRIAGES, BIRTHS, *and* DEATHS, *per* 1,000 PERSONS LIVING *in the Years* 1910-1904, *and in the* QUARTERS *of those Years.*

Calendar YEARS, 1910-1904:—*General Ratios.*

YEARS	1910.	Mean 1900-'09.	1909.	'08	'07.	'06.	'05.	'04.
Estmtd. Popln. of England and Wales *in thousands* in middle of each Year	36,169,	—	35,757,	35,349,	34,946,	34,547,	34,153,	33,763,
Persons Married	—	15·5	14·6	14·9	15·8	15·6	15·3	15·2
Births	24·8	27·5	25·6	26·5	26·3	27·1	27·2	27·9
Deaths	13·4	15·8	14·5	14·7	15·0	15·4	15·2	16·2

QUARTERS *of each Calendar Year*, 1910-1904.

(I.) PERSONS MARRIED:—*Ratio per* 1,000.

Qrs. ended last day of	1910.	Mean 1900-'09	1909.	'08.	'07.	'06.	'05.	'04.
March	12·6	11·2	10·2	10·8	12·3	10·7	10·7	10·7
June	13·5	16·8	16·1	16·7	16·0	17·3	16·7	17·0
September	16·8	17·1	16·4	16·6	18·0	17·4	16·9	16·8
December	—	16·8	15·5	15·7	16·9	17·0	16·7	16·5

(II.) BIRTHS:—*Ratio per* 1,000.

Qrs. ended last day of	1910.	Mean 1900-'09.	1909.	'08.	'07.	'06.	'05.	'04.
March	24·9	28·0	25·9	27·2	26·6	27·9	28·2	28·6
June	26·0	28·1	26·6	27·7	27·4	27·5	27·8	28·3
September	24·9	27·5	25·4	26·6	26·2	26·9	27·3	27·9
December	23·4	26·2	24·4	24·6	24·9	25·9	25·5	26·9

(III.) DEATHS:—*Ratio per* 1,000.

Qrs. ended last day of	1910.	Mean 1900-'09.	1909.	'08.	'07.	'06.	'05.	'04.
March	15·3	18·3	18·2	17·7	18·6	16·5	17·6	18·2
June	12·8	15·1	14·0	13·7	14·6	14·6	14·5	14·8
September	11·4	14·2	11·6	12·8	12·1	14·9	14·0	15·7
December	13·9	15·6	14·1	14·5	14·8	15·6	14·8	16·3

B.—*Special Town Table:*—POPULATION; BIRTH-RATE *and* DEATH-RATE *in each Quarter of* 1910, *in the* SEVENTY-SEVEN *Large Towns.*

Cities and Boroughs.	Estimated Population in the Middle of the Year 1910.	Annual Rate to 1,000 Living during the Thirteen Weeks ending							
		2nd April, 1910. (1st Quarter.)		2nd July, 1910. (2nd Quarter.)		1st Oct., 1910. (3rd Quarter.)		31st Dec., 1910. (4th Quarter.)	
		Births.	Deaths.	Births.	Deaths.	Births.	Deaths.	Births.	Deaths.
Seventy-seven towns	16,940,895	25·4	14·8	26·1	12·6	24·7	11·6	23·6	14·6
Including—									
London*	4,872,702	24·5	14·3	24·9	11·6	23·4	10·3	22·9	14·7
West Ham	328,585	27·7	12·8	27·2	10·8	26·2	9·6	24·5	13·6
Croydon	164,485	23·9	12·9	24·3	10·5	23·2	9·2	21·6	11·3
Brighton	131,900	19·4	15·5	21·9	12·4	20·0	12·5	18·2	16·6
Portsmouth	217,989	26·6	15·4	26·6	12·9	26·5	11·2	26·9	15·6
Plymouth	126,266	19·4	16·3	20·7	12·5	20·2	10·9	20·7	14·3
Bristol	382,550	21·7	13·1	22·8	10·9	21·7	9·5	20·5	12·6
Cardiff	199,189	24·1	13·5	26·2	12·1	24·7	9·9	22·2	12·0
Swansea	98,817	33·7	21·6	34·6	15·0	32·0	15·9	30·2	17·9
Wolverhampton	105,962	21·9	13·2	24·8	12·8	23·2	10·3	20·3	13·9
Birmingham	570,113	27·2	16·3	26·8	12·4	25·9	11·2	25·0	14·8
Norwich	125,446	23·2	14·5	24·3	11·4	22·5	11·6	22·0	12·4
Leicester	248,374	21·3	12·5	22·9	9·9	20·9	10·1	20·7	12·7
Nottingham	266,471	26·0	15·9	26·2	13·3	24·9	11·7	22·2	15·8
Derby	131,256	22·6	12·5	25·8	10·1	24·7	9·5	23·6	12·2
Birkenhead	122,431	29·0	19·0	30·3	14·2	32·7	15·0	29·8	16·7
Liverpool†	767,606	30·8	19·4	31·1	17·7	30·0	16·4	28·6	17·5
Bolton	190,315	23·0	14·5	23·7	12·1	22·7	12·8	22·2	14·3
Manchester	716,354	28·7	16·9	29·2	16·2	25·9	14·1	24·6	16·9
Salford	244,636	27·5	15·7	26·9	15·3	26·5	14·0	26·1	15·6
Oldham	144,111	26·3	19·2	27·8	17·8	25·6	14·3	23·6	17·8
Burnley	107,448	25·9	19·2	26·1	14·0	24·7	14·0	23·0	18·1
Blackburn	137,972	21·9	15·3	22·5	13·5	21·0	12·6	20·3	15·3
Preston	119,253	24·7	17·4	24·8	15·7	24·0	15·8	21·1	16·1
Huddersfield	94,702	21·6	19·1	23·5	15·2	23·5	14·8	23·1	17·4
Halifax†	112,818	16·1	13·4	19·1	12·9	16·5	12·8	14·4	12·2
Bradford	295,865	18·3	15·1	19·5	14·4	19·3	12·6	17·3	14·0
Leeds	490,985	22·6	14·2	23·1	13·3	22·2	12·4	20·8	14·8
Sheffield	478,763	27·5	14·0	26·9	12·3	26·6	13·0	25·2	14·4
Hull	280,006	29·3	17·1	29·3	13·0	28·6	15·0	27·2	15·8
Sunderland	161,083	27·1	17·4	30·5	14·4	29·3	15·4	27·2	16·3
Gateshead	133,676	27·4	13·5	29·3	12·7	27·1	12·0	24·9	13·7
Newcastle-on-Tyne	285,951	26·5	14·2	26·8	13·1	27·0	13·3	25·5	14·9

* Including deaths of Londoners in the Metropolitan workhouses, hospitals, and lunatic asylums outside the County of London, but excluding deaths of non-Londoners in the London Fever Hospital, the Metropolitan Asylums Hospitals, and the Middlesex County Lunatic Asylum, within the County of London. The deaths in the other towns have been similarly corrected.

† As extended in 1902.

C.—*Comparative Table of* CONSOLS, PROVISIONS, COAL, *and* PAUPERISM *in each* QUARTER *of* 1908-09-10.

Cols...	1	2	3	4			5			6	7	
	Average Prices of										PAUPERISM.	
Quarter ended	CONSOLS (for Money) per 100*l.* Stock.*	Average Minimum Rate per Cent. of DISCOUNT Charged by the Bank of England.*	WHEAT per Quarter.†	Price per Pound at the Metropolitan Cattle Market (Sinking the Offal).‡						Average Price of Seaborne COAL per Ton in the London Market.§	Average Number of PAUPERS Relieved on the *Last Day* of each Week.	
				Beef.			Mutton.					
				Inferior Quality.	Second Quality.	First Quality.	Inferior Quality.	Second Quality.	First Quality.		In-door.	Out-door.
1908	£ *s.* *d.*	£	*s.* *d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*s.* *d.*		
Mar. 31	86 5 11	4·24	33 2	3⅞	5¼	6¾	6⅜	8¼	9½	18 8	274.123	545,068
June 30	87 1 1	2·81	32 1	4¼	5⅞	7¼	5¼	7⅜	8½	17 2¶	259.533	525,118
Sept. 30	86 11 3	2·50	31 2	4	5¾	7¼	5⅜	7¼	8⅝	16 11¶	253.234	519,224
Dec. 31	84 6 6	2·50	31 8	4	5¾	7¼	5½	7¼	8½	17 3¶	273,455	541,619
1909												
Mar. 31	83 17 8	2·92	33 11	5¼	6¼	7½	4½	6⅞	8⅜	17 5¶	287,621	558,524
June 30	84 16 11	2·50	41 1	4	6	7¼	4⅞	6¾	7⅞	16 4	268,607	530,821
Sept. 30	84 0 6	2·50	40 3	3¾	6⅝	7⅜	4½	6½	7¾	16 7	260,344	518,042
Dec. 31	82 12 6	4·48	32 5	4	6	7⅜	4½	6⅝	7⅞	17 3	278,216	522,530
1910												
Mar. 31	81 19 0	3·52	33 1	4⅞	6½	7½	5⅜	7⅜	9	18 0	289.514	535,808
June 30	81 13 11	3·72	31 8	4¾	6½	7⅜	5¼	7½	8⅞	16 11	271,531	510,628
Sept. 30	81 3 7	3·02	31 10	4⅛	6⅞	7⅞	5⅛	7⅛	8½	15 6	261.872	499,342
Dec. 31	79 9 5	4·63	30 5	3¾	6⅝	7½	5	6⅞	8½	15 9	280.308	509,964

* The prices of Consols and the Rate of Discount are furnished by the Chief Cashier of the Bank of England.

† As published by the Board of Agriculture.

‡ Furnished by the Board of Agriculture.

§ Furnished by the Mineral Statistics Department of the Home Office.

‖ Sunderland coal only.

¶ Sunderland and Hartlepool coal only.

No. II.—SCOTLAND.

BIRTHS, DEATHS, AND MARRIAGES, IN THE YEAR ENDED 31ST DECEMBER, 1910.

I.—*Serial Table:—Number of* BIRTHS, DEATHS, *and* MARRIAGES *in Scotland, and their Proportion to the Population estimated to the Middle of each Year, during each Quarter of the Years* 1910-1906 *inclusive.*

	1910.		1909.		1908.		1907.		1906.	
	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.
1st Quarter—										
Births	30,421	25·0	32,373	26·9	32,503	27·0	31,508	26·8	32,976	28·3
Deaths........	20,603	17·0	21,469	17·9	23,997	20·0	22,635	19·2	20,488	17·6
Marriages ..	7,317	6·0	7,111	5·9	7,591	6·3	7,268	6·2	7,302	6·3
2nd Quarter—										
Births	33,812	27·5	34,671	28·5	35,611	29·6	34,511	29·0	34,960	29·7
Deaths........	18,592	15·1	18,478	15·2	19,499	16·2	20,119	16·9	19,306	16·4
Marriages ..	7,928	6·5	8,171	6·7	8,813	7·3	8,864	7·4	8,699	7·4
3rd Quarter—										
Births	30,061	24·2	31,186	25·4	32,612	26·8	31,427	26·1	32,109	27·0
Deaths........	15,331	12·3	14,964	12·2	16,325	13·4	15,721	13·1	16,439	13·8
Marriages ..	7,975	6·4	7,777	6·3	8,044	6·6	8,994	7·5	8,576	7·2
4th Quarter—										
Births	29,705	23·9	30,352	24·7	30,611	25·2	31,343	26·1	31,875	26·8
Deaths........	17,716	14·3	19,683	16·0	18,018	14·8	18,792	15·6	19,352	16·3
Marriages ..	7,646	6·2	7,033	5·7	7,135	5·9	8,134	6·7	8,546	7·2
Year—										
Population .			4,877,648		4,826,587		4,776,063		4,726,070	
Births			128,582	26·4	131,337	27·2	128,789	27·0	131,920	27·9
Deaths........			74,594	15·3	77,839	16·1	77,267	16·2	75,585	16·0
Marriages ..			30,092	6·2	31,583	6·5	33,260	7·0	33,123	7·0

II.—*Special Average Table:—Number of Births, Deaths, and Marriages in Scotland and in the Town and Country Districts for each Quarter of the Year ending* 31*st December*, 1910, *and their Proportion to the Population; also the Number of Illegitimate Births, and their Proportion to the Total Births.*

Registration Groups of Districts.	Total Births.		Deaths.		Marriages.	
	Number.	Per 1,000 of Population.	Number.	Per 1,000 of Population.	Number.	Per 1,000 of Population.
1st Quarter—						
SCOTLAND	30,421	25·0	20,603	17·0	7,317	6·0
Principal towns	13,897	24·6	9,434	16·7	3,766	6·7
Large ,,	4,169	27·3	2,729	17·9	995	6·5
Small ,,	6,379	26·2	4,010	16·5	1,408	5·8
Mainland rural	5,462	24·1	3,945	17·4	1,012	4·5
Insular ,,	514	18·8	485	17·8	136	5·0
2nd Quarter—						
SCOTLAND	33,812	27·5	18,592	15·1	7,928	6·5
Principal towns	15,324	26·8	8,507	14·9	4,326	7·6
Large ,,	4,793	31·1	2,578	16·7	990	6·4
Small ,,	7,195	29·3	3,590	14·6	1,389	5·6
Mainland rural	6,056	26·4	3,483	15·2	1,162	5·1
Insular ,,	444	16·1	434	15·7	61	2·2
3rd Quarter—						
SCOTLAND	30,061	24·2	15,331	12·3	7,974	6·4
Principal towns	13,448	23·3	7,115	12·3	4,441	7·7
Large ,,	4,228	27·1	1,974	12·7	1,119	7·2
Small ,,	6,412	25·8	3,087	12·4	1,472	5·9
Mainland rural	5,419	23·4	2,838	12·3	887	3·8
Insular ,,	554	19·9	317	11·4	55	2·0
4th Quarter—						
SCOTLAND	29,705	23·9	17,716	14·3	7,646	6·2
Principal towns	13,261	23·0	8,211	14·2	3,713	6·4
Large ,,	4,089	26·2	2,415	15·5	979	6·3
Small ,,	6,317	25·4	3,429	13·8	1,560	6·3
Mainland rural	5,467	23·6	3,248	14·0	1,304	5·6
Insular ,,	571	20·5	413	14·8	90	3·2

Population of Scotland.

Population.	Scotland.	Principal Towns.	Large Towns.	Small Towns.	Mainland Rural.	Insular Rural.
By Census of 1901	4,472,103	1,974,872	557,225	895,090	928,247	116,669
Estimated to the middle of 1910	4,929,251	2,293,121	618,869	986,954	919,523	110,784

No. III.—IRELAND.

IRELAND.—*Number of Births, Deaths and Marriages in each Province for each Quarter of* 1910 *and their Proportion to the Population.*

Provinces.	Births.		Deaths.		Marriages.*	
	Number.	Annual rate per 1,000 of population.	Number.	Annual rate per 1,000 of population.	Number.	Annual rate per 1,000 of population.
1st quarter—						
Leinster	6,809	23·6	6,183	21·5	1,535	5·3
Munster	5,967	22·2	4,595	17·1	917	3·4
Ulster	9,342	23·6	7,968	20·1	2,241	5·7
Connaught	3,610	22·3	2,537	15·7	416	2·6
Ireland	25,728	23·5	21,283	19·5	5,109	4·7
2nd quarter—						
Leinster	7,312	25·4	5,624	19·5	1,307	4·5
Munster	6,149	22·9	4,605	17·1	1,813	6·7
Ulster	10,111	25·6	7,807	19·7	2,107	5·3
Connaught	3,511	21·7	2,503	15·5	772	4·8
Ireland	27,083	24·8	20,539	18·8	5,999	5·5
3rd quarter—						
Leinster	6,974	24·2	4,373	15·2	1,746	6·1
Munster	5,792	21·5	3,532	13·1	1,087	4·0
Ulster	9,290	23·5	5,727	14·5	1,944	4·9
Connaught	3,156	19·5	1,864	11·5	682	4·2
Ireland	25,212	23·1	15,496	14·2	5,459	5·0
4th quarter—						
Leinster	6,290	21·8	5,175	18·0	1,676	5·8
Munster	5,611	20·9	3,899	14·5	1,019	3·8
Ulster	8,614	21·8	6,469	16·3	2,344	5·9
Connaught	3,372	20·8	2,193	13·6	425	2·6
Ireland	23,887	21·9	17,736	16·2	5,464	5·0
Total	101,910	23·3	75,054	17·2	—	—

* For the preceding quarter.

Population of Ireland.

	Leinster.	Munster.	Ulster.	Connaught.	Ireland.
By census of 1901 ...	1,152,829	1,076,188	1,582,826	646,932	4,458,775
Estimated to middle of 1910	—	—	—	—	4,368,568

IRELAND.

	Births.		Deaths.		Marriages.*	
	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.	Number.	Annual rate * per 1 000 persons.
1st quarter, 1910—						
Total rural districts	16,103	20·7	13,697	17·6	—	
Total urban districts	9,625	28·6	7,586	22·6	—	
Dublin co. borough	2,426	—	2,066	—	549	
Belfast co. borough	2,737	—	1,945	—	731	
2nd quarter—						
Total rural districts	16,860	22·3	13,568	17·9	—	
Total urban districts	10,223	30·4	6,971	20·7	—	
Dublin co. borough	2,628	—	1,652	—	410	
Belfast co. borough	2,942	—	2,143	—	607	
3rd quarter—						
Total rural districts	15,452	20·4	9,826	13·0	—	
Total urban districts	9,760	29·0	5,670	16·9	—	
Dublin co. borough	2,592	—	1,528	—	583	
Belfast co. borough	2,768	—	1,590	—	581	
4th quarter—						
Total rural districts	15,157	19·5	11,576	14·9	—	
Total urban districts	8,710	25·9	6,128	18·3	—	
Dublin co. borough	2,173	—	1,733	—	637	
Belfast co. borough	2,477	—	1,567	—	820	

* For the preceding quarter.

No. IV.—GREAT BRITAIN AND IRELAND.

SUMMARY *of* MARRIAGES, *in the Year ended* 30*th September*, 1910; *and of* BIRTHS *and* DEATHS, *in the Year ended* 31*st December*, 1910.

(Compiled from the Quarterly Returns of the respective Registrars-General.)

Countries.	[000's omitted.] Area in statute acres.	[000's omitted.] Population middle 1910, estimated.	Marriages.	Per 1,000 of population.	Births.	Per 1,000 of population.	Deaths.	Per 1,000 of population.
		No.	No.	Ratio.	No.	Ratio.	No.	Ratio.
England and Wales	37,327,	36,169,	263,614	7·29	897,100	24·80	483,321	13·36
Scotland	19,070,	4,929,	30,866	6·26	123,999	25·16	72,242	14·66
Ireland	20,228,	4,369,	22,018	5·04	101,910	23·33	75,054	17·18
Great Britain and Ireland	76,625,	45,467,	316,498	6·96	1,123,009	24·70	630,617	15·87

Values of Imports *into the United Kingdom for the Years* 1908-09-10.*

[From the Monthly Trade Returns, December, 1910.]

	Year ended 31st December,			Increase (+) or Decrease (−) in 1910 as Compared with 1909.	Increase (+) or Decrease (−) in 1910 as Compared with 1903.
	1908.	1909.	1910.		
I. Food, Drink, and Tobacco –	£	£	£	£	£
A. Grain and flour	72,733,334	83,107,421	77,298,365	− 5,809,056	+ 4,565,031
B. Meat, including animals for food	49,448,334	47,623,428	48,879,065	+ 1,255,637	− 569,269
C. Other food and drink—					
(1.) Non-dutiable	68,576,894	67,848,986	72,254,717	+ 4,405,731	+ 3,677,823
(2.) Dutiable	48,208,374	50,752,885	54,731,583	+ 3,978,698	+ 6,523,209
D. Tobacco	5,167,153	4,986,663	4,624,686	− 361,977	− 542,467
Total, Class I	244,134,089	254,319,383	257,788,416	+ 3,469,033	+13,654,327
II. Raw Materials and Articles Mainly Unmanufactured—					
A. Coal, coke, and manufactured fuel	4,689	8,297	34,119	+ 25,822	+ 29,430
B. Iron ore, scrap iron, and steel	4,974,723	5,076,131	6,261,272	+ 1,185,141	+ 1,286,549
C. Other metallic ores	8,901,105	8,327,193	8,973,522	+ 646,329	+ 72,417
D. Wood and timber	24,306,169	23,591,579	26,198,854	+ 2,607,275	+ 1,892,685
E. Cotton	55,834,883	60,295,049	71,716,808	+11,421,759	+15,881,925
F. Wool	30,746,990	35,041,766	37,362,789	+ 2,321,023	+ 6,615,799
G. Other textile materials	13,698,178	12,127,707	12,802,002	+ 674,295	+ 896,176
H. Oil seeds, nuts, oils, fats, and gums	28,514,967	31,039,883	37,587,030	+ 6,547,147	+ 9,072,063
I. Hides and undressed skins	9,422,965	11,617,756	12,881,066	+ 1,263,310	+ 3,458,101
J. Paper making materials	4,610,997	4,499,281	4,973,444	+ 474,163	+ 362,447
K. Miscellaneous	22,439,351	28,520,854	42,451,126	+13,930,272	+20,011,775
Total, Class II.	203,455,017	220,145,496	261,242,032	+41,096,536	+57,787,015
III. Articles Wholly or Mainly Manufactured—					
A. Iron and steel and manufactures thereof	7,681,512	7,971,591	9,093,795	+ 1,122,201	+ 1,412,283
B. Other metals and manufactures thereof	21,659,602	24,316,328	24,699,531	+ 353,203	+ 39,929
C. Cutlery, hardware, implements (except machine tools), and instruments	3,750,177	3,719,049	4,673,888	+ 954,839	+ 923,711
D. Electrical goods and apparatus (other than machinery and telegraph and telephone wire)	1,263,762	1,322,509	1,686,469	+ 363,960	+ 422,707
E. Machinery	4,552,904	4,438,336	4,471,303	+ 32,967	− 81,601
F. Ships (new)	18,199	23,926	27,104	+ 3,178	+ 8,905
G. Manufactures of wood and timber (including furniture)	1,970,917	2,054,258	2,338,470	+ 284,212	+ 367,553
H. Yarns and textile fabrics—					
(1.) Cotton	9,475,795	9,839,091	10,874,620	+ 1,035,529	+ 1,398,825
(2.) Wool	9,500,056	9,727,760	9,599,281	− 128,479	+ 99,225
(3.) Silk	12,536,224	12,759,931	13,521,001	+ 761,070	+ 984,777
(4.) Other materials	6,402,863	7,324,876	8,055,571	+ 730,695	+ 1,652,708
I. Apparel	4,200,819	5,072,261	5,107,151	+ 34,890	+ 906,332
J. Chemicals, drugs, dyes, and colours	10,185,617	10,596,593	11,259,716	+ 663,123	+ 1,074,099
K. Leather and manufactures thereof (including gloves, but excluding boots and shoes)	11,562,700	11,617,130	11,825,749	+ 208,619	+ 263,049
L. Earthenware and glass	3,685,330	3,757,389	3,817,405	+ 60,016	+ 132,075
M. Paper	5,798,665	5,647,437	6,413,704	+ 766,267	+ 615,039
N. Railway carriages and trucks (not of iron), motor cars, cycles, carts, &c.	4,445,851	4,690,781	5,606,679	+ 915,898	+ 1,160,828
O. Miscellaneous	21,391,604	22,761,845	23,784,176	+ 1,022,331	+ 2,389,572
Total, Class III	143,085,597	147,671,094	156,855,613	+ 9,184,519	+13,770,016
IV. Miscellaneous and Unclassified (including parcel post)	2,278,784	2,568,984	2,554,112	− 14,872	+ 275,328
Total	592,953,487	624,704,957	678,440,173	+53,735,216	+85,486,686

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* The values of the imports represent the cost, insurance, and freight; or, when goods are consigned for sale, the latest sale value of such goods.

Values of **Exports** *of British and Irish Produce and Manufactures for the Years* **1908-09-10.***

[From the Monthly Trade Returns, December, 1910.]

	Year ended 31st December,			Increase (+) or Decrease (−) in 1910 as Compared with 1909.	Increase (+) or Decrease (−) in 1910 as Compared with 1908.
	1908.	1909.	1910.		
I. FOOD, DRINK, AND TOBACCO—	£	£	£	£	£
A. Grain and flour	3,522,912	3,399,004	3,417,546	+ 18,542	− 105,366
B. Meat including animals for food	822,820	797,203	937,821	+ 140,618	+ 115,001
C. Other food and drink	15,962,044	17,461,416	19,715,338	+ 2,253,922	+ 3,753,294
D. Tobacco	1,399,994	1,678,268	2,042,678	+ 364,410	+ 642,684
Total, Class I.	21,707,770	23,335,891	26,113,383	+ 2,777,492	+ 4,405,613
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—					
A. Coal, coke, and manufactured fuel	41,615,923	37,129,978	37,812,573	+ 682,595	− 3,803,350
B. Iron ore, scrap iron, and steel	413,349	509,758	478,171	− 31,587	+ 64,822
C. Other metallic ores	71,777	95,553	72,036	− 23,517	+ 259
D. Wood and timber	98,218	108,673	128,794	+ 20,121	+ 30,576
E. Cotton	...	...	...	...	...
F. Wool	3,035,592	4,648,565	4,219,746	− 428,819	+ 1,184,154
G. Other textile materials	245,471	214,251	323,818	+ 109,567	+ 78,347
H. Oil seeds, nuts, oils, fats, and gums	3,091,825	3,400,766	5,030,215	+ 1,629,449	+ 1,938,390
I. Hides and undressed skins	1,424,760	1,916,634	1,758,277	− 158,357	+ 333,517
J. Paper making materials	543,977	678,049	743,869	+ 65,820	+ 199,892
K. Miscellaneous	2,215,048	2,453,780	2,769,852	+ 316,072	+ 554,804
Total, Class II.	52,755,940	51,156,007	53,337,351	+ 2,181,344	+ 581,411
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—					
A. Iron and steel and manufactures thereof	37,406,028	38,192,142	43,002,937	+ 4,810,795	+ 5,596,909
B. Other metals and manufactures thereof	8,856,472	8,708,945	10,360,159	+ 1,651,214	+ 1,503,687
C. Cutlery, hardware, implements (except machine tools), and instruments	5,492,463	5,412,652	6,424,002	+ 1,011,350	+ 931,539
D. Electrical goods and apparatus (other than machinery, and telegraph and telephone wire)	1,943,104	2,230,799	4,117,840	+ 1,887,041	+ 2,174,736
E. Machinery	30,999,516	28,057,643	29,296,721	+ 1,239,078	− 1,702,795
F. Ships (new)	10,567,475	5,927,114	8,769,331	+ 2,842,217	− 1,798,144
G. Manufactures of wood and timber (including furniture)	1,256,805	1,451,073	1,832,647	+ 381,574	+ 575,842
H. Yarns and textile fabrics—					
(1.) Cotton	95,055,513	93,444,799	105,915,626	+ 12,470,827	+ 10,860,113
(2.) Wool	28,122,981	30,671,804	37,524,473	+ 6,852,669	+ 9,401,492
(3.) Silks	1,685,622	1,859,979	2,276,956	+ 416,977	+ 591,334
(4.) Other materials	10,724,427	12,441,525	13,484,146	+ 1,042,621	+ 2,759,719
I. Apparel	8,852,775	9,824,125	12,717,104	+ 2,892,979	+ 3,864,329
J. Chemicals, drugs, dyes, and colours	16,271,089	16,783,019	18,571,989	+ 1,788,970	+ 2,300,900
K. Leather and manufactures thereof (including gloves, but excluding boots and shoes)	3,826,258	4,242,356	4,688,276	+ 445,920	+ 862,018
L. Earthenware and glass	3,700,037	3,687,249	4,349,109	+ 661,860	+ 649,072
M. Paper	2,314,967	2,559,371	3,118,573	+ 559,202	+ 803,606
N. Railway carriages and trucks (not of iron), motor cars, cycles, carts, &c.	6,429,540	6,163,770	7,453,329	+ 1,289,559	+ 1,023,879
O. Miscellaneous	23,076,993	25,100,103	29,120,068	+ 4,019,965	+ 6,043,075
Total, Class III	296,581,975	296,758,468	343,023,286	+ 46,264,818	+ 46,441,311
IV. MISCELLANEOUS AND UNCLASSIFIED (including parcel post)	6,058,139	6,929,981	8,115,791	+ 1,185,810	+ 2,057,652
Total	377,103,824	378,180,347	430,589,811	+ 52,409,464	+ 53,485,987

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* The values of the exports represent the cost and the charges of delivering the goods on board the ship, and are known as the "free on board" values.

Trade of United Kingdom, 1910-1909-1908.—*Declared Real Value (Ex-duty) of* **Imports** *at Port of Entry, and therefore including Freight and Importer's Profit; and the Distribution of* **Exports** *of British and Irish Produce and Manufactures from the United Kingdom, according to their Declared Real Value.*

[000's omitted.]

Merchandise (*excluding Gold and Silver*) Imported from, and Exported to, the following Foreign Countries, &c.	1910.		1909.		1908.	
	Imports from	*Exports to*	Imports from	*Exports to*	Imports from	*Exports to*
	£	£	£	£	£	£
Russia { Northern ports	43,648,	12,405,	37,970,	10,975,	20,395,	11,455,
Russia { Southern ,,					7,775,	1,058,
Sweden	11,834,	6,699,	9,725,	6,215,	10,353,	6,364,
Norway	6,631,	4,035,	6,473,	3,442,	6,508,	4,089,
Denmark*	19,463,	5,436,	18,768,	5.075,	19,477,	4,731,
Germany†	61,845,	36,922,	57,801,	32,306,	38,037,	33,374,
Holland	18,533,	12,711,	16,832,	11,732,	36,359,	11,547,
Java	3,034,	3,408,	1,978,	3,099,	985,	3,064,
Belgium†	19,361,	10,866,	17,655,	10,609,	27,153,	11,661,
France†	44,298,	22,500,	44,209,	21,469,	48,077,	22,403,
Portugal†	3,097,	2,873,	2,874,	2,288,	2,953,	2,436,
Spain†	13,931,	4,890,	13,435,	4,866,	13,345,	5,303,
Italy†	6,459,	12,552,	6.265,	12,147,	3,441,	15,034,
Austria-Hungary	7,516,	3,996,	8,088,	3,538,	1,304,	4,304,
Greece	2,252,	1,545,	1,553,	1,482,	1,913,	1,906,
Roumania	3,185,	1,827,	2,922,	1,718,	3,434,	2,003,
Turkey (European and Asiatic) and Crete	4,669,	8,635,	5,133,	7,612,	5,182,	6,977,
Egypt	21,005,	8,721,	19,867,	7,997,	17,593,	9,588,
Philippine Islands and Guam	1,659,	1,172,	1,464,	1,014,	1,676,	1,060,
China‡	5,530,	9,178,	4,879,	8,445,	3,042,	9,217,
Japan§	4,326,	10,110,	3,701,	8,331,	2,926,	9,912,
United States { Atlantic	117,620,	31,418,	118,356,	29,728,	124,175,	21,289,
United States { Pacific						
Peru	3,688,	1,319,	3,041,	1,339,	2,887,	1,382,
Chile	5,206,	5,464,	5,516,	4,627,	7,383,	3,956,
Brazil	17,506,	16,438,	11,290,	8,468,	6,939,	8,145,
Argentine Republic	28,937,	19,088,	32.732,	18,721,	35,751,	16,434,
Other countries	32,611,	29,064,	26,922,	23,877,	14,197,	22,787,
Total—Foreign Countries	507,845,	283,272,	478,449,	251,120,	463,260,	251,481,
BRITISH POSSESSIONS.						
Channel Isles	1,593,	1,284,	1,691,	1,252,	1,602,	1,283,
Nigerian Protectorate	3,243,	2,888,	2,292,	2,697,	2,109,	2,536,
Cape of Good Hope	7,736,	8,079,	7,693,	6,196,	6,105,	8,020,
British India, including	42,814,	46,003,	35,442,	43,631,	27,348,	44,797,
Burmah					2,277,	4,667,
Straits Settlements (including Malay States)	13,096,	4,565,	8,460,	3,678,	7,945,	3,385,
Ceylon	5,985,	2,322,	5,556,	1,824,	5,135,	1,762,
Australia	38,656,	27,631,	32,649,	23,971,	29,079,	22,931,
New Zealand	20,942,	8,629,	17,731,	7,352,	14,665,	8,764,
Canada	25,641,	19,683,	25,229,	15,672,	26,287,	12,223,
British West Indies (including Bahamas)	2,347,	2,434,	2,163,	2,393,	2,143,	2,300,
Other Possessions	8,542,	23,800,	6,385,	18,593,	5,186,	13,071,
Total—British Possessions	170,595,	147,318,	145,291,	127,259,	129,881,	125,739,
Total — Foreign Countries and British Possessions	678,440,	430,590,	624,740,	378,379,	593,141,	377,220,

* Including Faroë Islands.
‡ Excluding Hong Kong, Macão, and Wei-hai-Wei.
† Excluding Colonies.
§ Including Formosa.

Trade of United Kingdom, for the Years 1910-1905.—*Declared Value of the Total Exports of* **Foreign** *and* **Colonial** *Produce and Manufactures from the United Kingdom to each Foreign Country and British Possession.*

Merchandise Exported to the following Foreign Countries, &c.	[000's omitted.]					
	1910.	1909.	1908.	1907.	1906.	1905.
	£	£	£	£	£	£
Russia { Northern ports	8,956,	7,383,	7,345,	7,312,	6,659,	6,248,
Russia { Southern ,, ...			513,	604,	424,	467,
Sweden and Norway	1,592,	1,314,	1,342,	1,090, 445,	1,073, 488,	1,193,
Denmark*..................................	547,	531,	518,	629,	520,	483,
Germany†..................................	17,943,	14,920,	13,001,	15,374,	14,753,	13,060,
Holland†	5,143,	4,481,	4,291,	5,039,	5,229,	4,845,
Java	23,	24,	22,	18,	16,	19,
Belgium	6,903,	5,872,	5,413,	6,487,	5,159,	4,755,
France†....	11,065,	9,645,	9,506,	10,001,	8,340,	7,091,
Portugal†..................................	562,	455,	539,	614,	654,	575,
Spain†	524,	495,	502,	786,	714,	599,
Italy†	1,925,	1,133,	1,040,	1,130,	1,317,	897,
Austria-Hungary........................	1,118,	807,	758,	786,	815,	746,
Greece	29,	32,	41,	57,	103,	81,
Roumania..................................	54,	32,	48,	48,	76,	67,
Turkey (European and Asiatic) and Crete	195,	180,	201,	264,	327,	289,
Egypt	166,	160,	245,	209,	217,	212,
Philippine Islands and Guam	36,	28,	27,	36,	36,	298,
China ‡..................................	146,	110,	75,	109,	106,	162,
Japan §..................................	272,	267,	227,	213,	208,	135,
United States	30,748,	29,423,	21,177,	27,147,	25,475,	23,378,
Peru	119,	115,	144,	187,	109,	121,
Chile	326,	319,	223,	409,	319,	321,
Brazil	387,	306,	277,	304,	305,	296,
Argentine Republic..................	624,	499,	536,	476,	485,	379,
Other countries	2,309,	2,196,	1,741,	2,061,	1,770,	1,627,
Total to Foreign Countries...	91,712,	80,730,	69,752,	81,845,	75,797,	68,544,
BRITISH POSSESSIONS.						
Channel Islands	249,	248,	239,	226,	226,	215,
Nigerian Protectorates	244,	222,	236,	174,	107,	115,
Cape of Good Hope	821,	677,	843,	882,	1,078,	986,
Brit. India (including Burmah)	1,030,	1,116,	1,416,	1,209,	1,229,	1,363,
Straits Settlements (including Malay States)	117,	73,	78,	68,	68,	57,
Ceylon	135,	92,	94,	89,	92,	68,
Australia	3,412,	3,205,	2,720,	3,054,	2,552,	2,486,
New Zealand	751,	729,	746,	740,	652,	571,
Canada	2,945,	2,379,	1,967,	2,122,	1,788,	1,854,
British West Indies (including Bahamas)	470,	367,	378,	373,	319,	302,
Other Possessions	1,890,	1,527,	1,197,	1,170,	1,195,	1,238,
Total to British Possessions	12,064,	10,635,	9,914,	10,127,	9,306,	9,255,
Total to British Possessions and Foreign Countries	103,776,	91,365,	79,666,	91,972,	85,103.	77,799,

* Including Faroë Islands, Iceland and Greenland.

† Excluding Colonies.

‡ Excluding Hong Kong, Weihaiwei and Macão.

§ Including Formosa.

SHIPPING.—(United Kingdom.)—*Account of Tonnage of Vessels Entered and Cleared with Cargoes, from and to Various Countries, during the* **Years** *ended Dec.*, **1910-09-08.**

Countries from whence Entered and to which Cleared.	Total British and Foreign.					
	1910.		1909.		1908.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
FOREIGN COUNTRIES.						
Russia — Northern ports	2,942,723	2,187,057	2,761,249	2,217,171	2,559,805	2,233,550
Russia — Southern ,, ...	980,366	141,777	780,550	135,895	610,028	185,766
Russia — Pacific ,, ...	99 507	11,440	104,118	15,280	2,077	5,007
Sweden	1,609,774	2,429,773	1,375,365	2,407,383	1,537,477	2,564,635
Norway	1,371,934	1,530,507	1,341,025	1,446,355	1,418,876	1,446,331
Denmark..................................	528,345	1,953,087	551,028	2,050,775	533,424	1,994,807
Germany..................................	2,153,358	5,701,199	2,217,633	6,102,655	2,276,524	6 058,765
Netherlands	2,973,980	3,371,619	2,804,213	3,307,641	2,702,447	3,150,396
Belgium	2,237,716	2,728,774	2,056,043	2,645,841	2,115,308	2,833,239
France..................................	2,661,250	6,189,789	2,699,913	6,566,498	2,813,322	6,570,444
Spain	3,074,613	1,884,554	3,040,025	1,738,668	2,982,510	1,701,283
Portugal	301,591	672,178	287,295	687,921	264,155	654,804
Italy	386,334	4,580,173	383,758	4,714,634	362,255	4,605,768
Austria-Hungary	88,922	563,390	100,120	674,061	82,439	651,775
Greece..................................	192,069	269,765	164,513	253,952	150,350	268,334
Turkey	169,794	401,359	213,701	367,606	217,317	406,585
Roumania	301,610	223,192	265,567	196,600	258,045	218,242
Egypt	293,402	1,453,289	385,950	1,482,766	386,566	1,407,375
Algeria	407,686	540,403	330,901	497,244	324,518	499,647
Portuguese East Africa	131,462	461,515	156,687	386,986	162,892	303,207
United States of America	6,138,842	5,007,079	6,684,733	5,190,531	7,238,519	5,282,665
Mexico, Foreign W. Indies, and Central America	361,174	444,898	291,078	461,023	356,949	509,224
Colombia	121,506	53,197	76,287	42,831	16,220	41,946
Brazil	243,366	1,232,594	244,951	1,055,798	205,064	1,057,299
Peru..................................	232,145	247,756	173,148	261,558	152,880	126,050
Chile	160,360	653,585	197,270	585,681	284,817	583,580
Uruguay	36,545	520,152	18,822	502,969	24,621	478,992
Argentine Republic	1,702,616	2,331,788	1,800,596	2,156,078	2,034,611	2,095,571
China	53,506	81,183	62,313	50,735	40,745	43,421
Java..................................	115,982	268,235	110,900	258,927	75,502	217,128
Japan	597,411	700,471	567,618	652 305	448,003	608,952
Other countries	613,766	617,328	621,305	615,777	681,700	726,010
Total, Foreign Countries.	33,283,655	49,453,106	32,868,675	49,724,545	33,319,966	49,533,798
BRITISH POSSESSIONS.						
British North America	2,774,045	2,234,604	2,505,876	1,984,481	2,432,268	1,934,733
British India	2,095,763	1,594,856	1,747,584	1,710,157	1,471,714	1,519,167
Mauritius, Ceylon, Straits Settlements, & Hong Kong	61,880	335,310	51,739	314,668	65,808	322,084
Australia..............................	1,247,858	980,299	1,104,237	953,771	954,763	829,340
New Zealand	414,449	448,201	387,099	409,330	325,455	416,458
West Indies	224,375	288,671	216,264	299,169	246,934	299,409
Channel Islands..................	459,576	339,048	430,840	333,499	436,024	323,206
Gibraltar and Malta	67,582	355,061	69,504	305,824	74,488	323,571
British South Africa............	495,571	696,114	470,610	631,466	469,648	641,103
Other possessions	490,882	605,949	463,375	527,095	392,897	466,214
Total, British Possessions	8,331,981	7,878,113	7,447,128	7,469,460	6,869,999	7,075,285
TOTAL FOREIGN COUNTRIES AND BRITISH POSSESSIONS.						
Twelve Months ended December, 1910........	41,615,636	57,331,219	—	—	—	—
Twelve Months ended December, '09	—	—	40,315,803	57,194,005	—	—
Twelve Months ended December, '08.......	—	—	—	—	40,189,965	56,609,083

GOLD AND SILVER BULLION AND SPECIE.—(United Kingdom.) —*Declared Real Value of*, IMPORTED AND EXPORTED, *for the* Years 1910-09-08.

[000's omitted.]

Countries.	1910.		1909.		1908.	
	Gold.	*Silver.*	Gold.	*Silver.*	Gold.	*Silver.*
Imported from—	£	£	£	£	£	£
Australasia	2,318,	61,	2,613,	34,	2,762,	35,
S. America, Brazil, Mexico, W. Indies	1,921,	166,	1,218,	207,	788,	43,
United States	6,673,	11,333,	2,956,	9,966,	118,	8,306,
	10,912,	11,560,	6,787,	10,207,	3,668,	8,384,
France	4,361,	138,	4,371,	502,	226,	391,
Germany, Holland, and Belgium	958,	124,	1,180,	391,	3,496,	453,
Portugal, Spain, and Gibraltar	100,	31,	139,	63,	409,	61,
Malta and Egypt	1,793,	63,	3,703,	21,	644,	32,
China, with Hong Kong and Japan	—	84,	92,	37,	3,	—
West Coast of Africa	722,	9,	993,	45,	1,137,	173,
British Possessions in South Africa	34,081,	20,	32,957,	1,	31,814,	11,
British East Indies	2,220,	—	2,171,	16,	2,408,	—
All other Countries	2,175,	2,071,	2,299,	532,	2,340,	822,
Totals Imported	57,322,	14,100,	54,692,	11,815,	46,145,	10,327,
Exported to—						
France	4,275,	538,	7,825,	422,	26,212,	730,
Germany, Holland, Belg., and Sweden	10,958,	1,382,	7,955,	1,400,	4,679,	665,
Russia	1,558,	1,110,	2,348,	1,028,	2,933,	365,
Portugal, Spain, and Gibraltar	159,	64,	102,	200,	85,	154,
Malta and Egypt	10,800,	82,	4,100,	72,	1,720,	94,
	27,750,	3,176,	22,330,	3,122,	35,629,	2,008,
B. India, China, Hong Kong, and Japan	10,294,	8,609,	5,326,	8,841,	3,746,	9,647,
United States	2,742,	—	4,	5,	753,	201,
South Africa	1,490,	186,	127,	11,	20,	1,
S. America, Mexico, W. Indies	2,928,	165,	11,272,	183,	6,759,	354,
All other Countries	5,694,	1,335,	8,190,	623,	3,062,	1,073,
Totals Exported	50,898,	13,471,	47,249,	12,785,	49,969,	13,284,
Excess of imports	6,423,	629,	7,443,	—	—	—
,, exports	—	—	—	970,	—	—

BANK OF ENGLAND.

Pursuant to the Act 7th and 8th Victoria, cap. 32 (1844),

[0,000's omitted.]

1	2	3	4	5	6	7
Issue Department.					Collateral Columns.	
Liabilities.		Assets.				
Notes Issued.	Dates. (Wednesdays.)	Government Debt.	Other Securities.	Gold Coin and Bullion.	Notes in Hands of Public. (Col. 1 minus col. 16.)	Minimum Rates of Discount at Bank of England.
£ Mlns.	1910.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	Per cnt.
51,24	Jan. 5	11,02	7,43	32,79	28,87	4
52,29	,, 12	11,02	7,43	33,84	28,28	
53,95	,, 19	11,02	7,43	35,50	28,00	3½
54,38	,, 26	11,02	7,43	35,93	27,71	
54,13	Feb. 2	11,02	7,43	35,68	28,15	
53,85	,, 9	11,02	7,43	35,40	27,80	3
54,65	,, 16	11,02	7,43	36,20	27,53	
53,91	,, 23	11,02	7,43	35,46	27,75	
53,17	Mar. 2	11,02	7,43	34,72	28,26	
52,37	,, 9	11,02	7,43	33,92	27,99	
51,56	,, 16	11,02	7,43	33,11	27,90	4
50,97	,, 23	11,02	7,43	32,52	28,78	
50,74	,, 30	11,02	7,43	32,29	28,74	
50,48	April 6	11,02	7,43	32,03	28,93	
51,16	,, 13	11,02	7,43	32,71	28,66	
53,11	,, 20	11,02	7,43	34,66	28,54	
53 61	,, 27	11,02	7,43	35,16	28,24	
56,32	May 4	11,02	7,43	37,87	28,63	
55,79	,, 11	11,02	7,43	37,34	28,32	
55,17	,, 18	11,02	7,43	36,72	27,97	
56,06	,, 25	11,02	7,43	37,61	28,12	
57,76	June 1	11,02	7,43	39,31	28,38	3½
58,79	,, 8	11,02	7,43	40,34	28,01	3
59,52	,, 15	11,02	7,43	41,07	27,70	
60,24	,, 22	11,02	7,43	41,79	27,63	
59,67	,, 29	11,02	7,43	41,22	28,70	
58,69	July 6	11,02	7,43	40,24	28,85	
58,61	,, 13	11,02	7,43	40,16	28,56	
58,57	,, 20	11,02	7,43	40,12	28,41	
57,98	,, 27	11,02	7,43	39,53	28,61	
56,34	Aug. 3	11,02	7,43	37,89	29,06	
56,82	,, 10	11,02	7,43	38,37	28,66	
57,21	,, 17	11,02	7,43	38,76	28,41	
57,53	,, 24	11,02	7,43	39,08	28,31	
57,12	,, 31	11,02	7,43	38,67	28,63	
56,59	Sept. 7	11,02	7,43	38,14	28,20	
56,69	,, 14	11,02	7,43	38,24	27,65	
56,07	,, 21	11,02	7,43	37,62	27,64	
54,28	,, 28	11,02	7,43	35,83	27,96	4
51,39	Oct. 5	11,02	7,43	32,94	28,08	
50,73	,, 12	11,02	7,43	32,28	27,88	
49,09	,, 19	11,02	7,43	30,64	27,61	5
48,43	,, 26	11,02	7,43	29,98	27,75	
49,38	Nov. 2	11,02	7,43	30,93	28,61	
49,69	,, 9	11,02	7,43	31,24	28,17	
52,04	,, 16	11,02	7,43	33,59	28,52	
52,63	,, 23	11,02	7,43	34,18	28,15	
52,75	,, 30	11,02	7,43	34,30	28,39	4½
52,79	Dec. 7	11,02	7,43	34,34	28,20	
52,32	,, 14	11,02	7,43	33,87	28,00	
50,28	,, 21	11,02	7,43	31,83	28,64	
49,00	,, 28	11,02	7,43	30,55	28,61	

—WEEKLY RETURN.

for Wednesday in each Week, during the Year 1910.

[0,000's omitted.]

8	9	10	11	12	13	14	15	16	17	18
BANKING DEPARTMENT.										
Liabilities.						Assets.				Totals of Liabilities and Assets.
Capital and Rest.		Deposits.		Seven Day and other Bills.	DATES. (Wednesdys.)	Securities.		Reserve.		
Capital.	Rest.	Public.	Private.			Government.	Other.	Notes.	Gold and Silver Coin.	
£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	1910.	£ Mlns.	£ Mlns	£ Mlns.	£ Mlns.	£ Mlns.
14,55	3,36	9,94	49,14	,2	Jan. 5	17,51	36,21	22,38	,91	77,01
14,55	3,39	6,90	45,49	,3	" 12	14,71	30,74	24,02	,91	70,37
14,55	3,42	11,39	41,59	,4	" 19	14,71	29,38	25,95	,96	71,00
14,55	3,43	12,27	41,01	,3	" 26	14,61	29,05	26,66	,98	71,30
14,55	3,45	10,21	43,19	,2	Feb. 2	14,01	30,46	25,97	,98	71,43
14,55	3,47	7,89	44,76	,1	" 9	14,01	29,45	26,05	1,17	70,70
14,55	3,49	8,98	44,24	,4	" 16	14,01	29,04	27,13	1,12	71,30
14,55	3,51	8,25	44,41	,4	" 23	14,01	29,41	26,17	1,17	70,76
14,55	3,67	11,25	40,25	,2	Mar. 2	13,98	29,63	24,91	1,23	69,75
14,55	3,68	8,37	42,18	,2	" 9	13,98	29,12	24,38	1,32	68,80
14,55	3,68	9,64	40,90	,3	" 16	13,98	29,89	23,66	1,28	68,81
14,55	3,73	7,26	42,42	,4	" 23	13,98	30,43	22,19	1,40	68,00
14,55	3,73	8,88	43,11	,2	" 30	13,98	33,01	22,00	1,30	70,29
14,55	3,12	10,67	46,86	,2	April 6	18,47	33,98	21,55	1,22	75,22
14,55	3,13	10,66	43,05	,3	" 13	18,47	29,32	22,51	1,12	71,42
14,55	3,14	9,30	41,26	,3	" 20	14,82	27,83	24,56	1,08	68,29
14,55	3,16	8,44	43,51	,4	" 27	13,82	29,53	25,37	,98	69,70
14,55	3,17	10,32	44,14	,2	May 4	13,82	29,69	27,69	1,01	72,21
14,55	3,17	12,62	39,61	,3	" 11	13,82	27,72	27,47	,97	69,99
14,55	3,18	17,19	35,87	,2	" 18	13,82	28,68	27,20	1,12	70,82
14,55	3,17	21,30	37,79	,2	" 25	13,92	33,91	27,94	1,06	76,82
14,55	3,14	23,04	37,11	,2	June 1	14,94	32,41	29,39	1,13	77,86
14,55	3,16	24,93	37,59	,2	" 8	17,18	31,13	30,78	1,16	80,26
14,55	3,18	27,53	36,28	,2	" 15	17,87	30,56	31,82	1,32	81,57
14,55	3,22	27,87	40,02	,3	" 22	17,97	33,87	32,60	1,26	85,70
14,55	3,24	24,68	50,46	,2	" 29	17,97	42,83	30,97	1,18	92,96
14,55	3,45	21,51	45,44	,2	July 6	17,97	35,93	29,84	1,25	84,99
14,55	3,46	19,52	42,58	,3	" 13	17,97	30,90	30,05	1,21	80,14
14,55	3.48	17,59	43,30	,3	" 20	17,37	30,35	30,16	1,08	78,96
14,55	3,49	15,34	44,10	,3	" 27	17,37	29,64	29,37	1,13	77,51
14,55	3,48	15,21	41,61	,2	Aug. 3	17,37	29,09	27,28	1,13	74,87
14,55	3,50	16,56	40,56	,2	" 10	17,37	28,65	28,16	1,02	75,19
14,55	3,52	17,57	38,73	,2	" 17	16,04	28,39	28,80	1,16	74,39
14,55	3,52	17,93	39,90	,3	" 24	16,04	29,43	29,22	1,24	75,93
14,55	3,68	17,19	40,55	,2	" 31	15,87	30,35	28,19	1,26	75,98
14,55	3,68	16,86	40,15	,1	Sept. 7	15,87	29,70	28,39	1,30	75,26
14,55	3,68	13,33	43,75	,2	" 14	15,63	29,20	29,04	1,47	75,33
14,55	3,69	12,49	43,54	,2	" 21	15,27	29,11	28,43	1,47	74,28
14,55	3,74	12,79	42,44	,2	" 28	15,27	30,43	26,32	1,52	73,53
14,55	3,13	7,62	44,14	,2	Oct. 5	14,98	29,79	23,21	1,47	69,46
14,55	3,13	6,34	45,50	,3	" 12	14,98	30,23	22,85	1,50	69,56
14,55	3,14	7,09	41,93	,3	" 19	14,98	28,96	21,48	1,33	66,74
14,55	3,15	7,17	40,54	,3	" 26	14,98	28,44	20,68	1,34	65,44
14,55	3,15	6,57	38,41	,2	Nov. 2	14,33	26,27	20,77	1,33	62,70
14,55	3,16	6,61	37,64	,2	" 9	14,02	24,97	21,51	1,46	61,97
14,55	3,17	10,08	37,43	,3	" 16	14,64	25,73	23,52	1,38	65,27
14,55	3,19	11,26	39,00	,3	" 23	14,64	27,51	24,48	1,41	68,04
14,55	3,15	11,42	39,69	,2	" 30	14,64	28,49	24,36	1,33	68,82
14,55	3,16	10,06	41,10	,2	Dec. 7	15,59	27,40	24,59	1,30	68,88
14,55	3,16	9,81	41,26	,4	" 14	15,90	27,39	24,32	1,22	68,83
14,55	3,17	10,64	38,23	,4	" 21	15,90	28,06	21,63	1,04	66,63
14,55	3,19	11,71	44,26	,2	" 28	15,90	36,63	20,39	,81	73,73

REVENUE OF THE UNITED KINGDOM.

Net Produce in Quarters in 1910, *and in Financial Years ended* 31*st March*, 1909-10, 1908-09, 1907-08, 1906-07.

[000's omitted.]

QUARTERS, ended	31st March, 1910.	30th June, 1910.	30th September, 1910.	31st December, 1910.	Total for Calendar Year 1910.
	£	£	£	£	£
Customs	7,993,	7,602,	8,290,	8,975,	32,860,
Excise	7,162,	7,284,	12,071,	11,490,	38,007,
Stamps and estate, &c., duties	7,596,	10,312,	7,351,	7,974,	33,233,
Taxes (Land Tax and House Duty)	340,	1,830,	400,	60,	2,630,
Post Office	5,900,	3,470,	4,475,	5,120,	18,965,
Telephone Service	460,	460,	505,	455,	1,880,
Telegraph Service	700,	740,	905,	790,	3,135,
	30,151,	31,698,	33,997,	34,864,	130,710,
Property and Income Tax	6,065,	24,633,	6,291,	3,124,	40,113,
	36,216,	56,331,	40,288,	37,988,	170,823,
Crown Lands	130,	110,	85,	155,	480,
Interest on Advances	616,	5,	712,	11,	1,344,
Miscellaneous	439,	937,	456,	652,	2,484,
Land value duties	—	—	—	210,	210,
Totals	37,401,	57,383,	41,541,	39,016,	175,341,

YEARS, ended 31st March,	1909-10.	1908-09.	1909-10.		Corresponding Years.	
			Less.	More.	1907-08.	1906-07.
	£	£	£	£	£	£
Customs	30,348,	29,200,	—	1,148,	32,490,	33,115,
Excise	31,032,	33,650,	2,618,	—	35,720,	35,704,
Stamps and estate, &c., duties	29,845,	26,140,	—	3,705,	27,040,	27,034,
Taxes (Land Tax and House Duty)	710,	2,630,	1,920,	—	2,690,	2,600,
Post Office	18,220,	17,770,	—	450,	17,880,	17,170,
Telephone Service	1,720,	1,510,	—	210,	1,378	—
Telegraph Service	3,090,	3,020,	—	70,	3,042,	4,255,
	114,965,	113,920,	4,538,	5,583,	120,240,	119,878,
Property and Income Tax	13,295,	33,930,	20,635,	—	32,380,	31,600,
	128,260,	147,850,	25,173,	5,583,	152,620,	151,478,
Crown Lands	480,	530,	50,	—	520,	520,
Interest on Advances	1,269,	1,171,	—	98,	1,189.	1,098,
Miscellaneous	1,687,	2,027,	340,	—	2,209,	1,940,
Totals	131,696,	151,578,	25,563,	5,681,	156,538,	155,036,
			NET DECR. £19,882.			

Note.—The figures for 1907-08 have been adjusted to give effect to Section 17 (5) of "The Finance Act, 1907" (7 Edw. VII, c. 13), with respect to Local Taxation Grants, and the figures for 1906-07 have been similarly adjusted for the purpose of comparison.

FOREIGN EXCHANGES.—*Quotations as under,* LONDON *on Paris, Hamburg, Calcutta;—and New York and Hong Kong, on* LONDON, *for* 1910.

1	2	3	4	5		6		7	8		9		10	
				Calcutta.							Price per Ounce.			
DATES. (Tuesdays or nearest Dates.)	London on Paris.	London on Berlin. 3 m. d.	London on Vienna. 3 m. d.	London on Calcutta. Demand.		Indian Council Bills. Minimum Price per Rupee.		New York on London. 60 d. s.*	Hong Kong on London. 4 m. d.†		Gold Bars (Fine).		Standard Silver in Bars.	
1910.				*s.*	*d.*	*s.*	*d.*	$	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
Jan. 4 ...	25·16¼	20·65	24·32	1	4⅛	1	$4\frac{1}{16}$	4·84⅛	1	9½	77	9	2	$0\frac{3}{16}$
,, 18	25·17½	20·64	24·32	1	4⅛	1	$4\frac{1}{32}$	4·84⅛	1	9⅜	77	9	2	0⅛
Feb. 1	25·17½	20·64	24·30	1	$4\frac{3}{32}$	1	$4\frac{1}{32}$	4·83⅝	1	$8\frac{15}{16}$	77	9	2	0
,, 15	25·17½	20·63	24·30	1	4⅛	1	$4\frac{1}{16}$	4·84¼	1	9⅛	77	9	1	$11\frac{13}{16}$
Mar. 1	25·16¼	20·63	24·30	1	$4\frac{5}{32}$	1	$4\frac{3}{32}$	4·85	1	8⅝	77	9	1	$11\frac{5}{16}$
,, 15 ...	25·21¼	20·65	24·33	—		1	$4\frac{3}{32}$	4·83¾	1	$8\frac{13}{16}$	77	9⅛	1	11⅝
,, 29	25·22½	20·67	24·35	1	4⅛	1	$4\frac{1}{16}$	4·84¼	1	9¼	77	9	2	$0\frac{1}{16}$
Apl. 12	25·25	20·68	24·35	—		1	$4\frac{1}{16}$	4·84¼	1	9¼	77	9	2	0⅜
,, 26	25·25	20·69	24·36	1	$4\frac{3}{32}$	1	$4\frac{1}{32}$	4·84⅜	1	9⅝	77	9	2	$0\frac{11}{16}$
May 10	25·23¾	20·67	24·35	1	$4\frac{1}{32}$	1	$3\frac{31}{32}$	4·83½	1	$9\frac{9}{16}$	77	9	2	$0\frac{11}{16}$
,, 24	25·28¾	20·71	24·37	1	$3\frac{31}{32}$	1	$3\frac{29}{32}$	4·84⅛	1	9½	77	9	2	$0\frac{13}{16}$
June 7	25·27½	20·69	24·34	1	4	1	$3\frac{29}{32}$	4·84⅛	1	9½	77	9	2	0⅝
,, 21	25·21¼	20·65	24·32	1	$4\frac{1}{32}$	1	$3\frac{31}{32}$	4·84½	1	9½	77	9	2	0¾
July 5	25·17½	20·60	24·26	—		1	$3\frac{31}{32}$	4·85¾	1	9⅜	77	9	2	0⅝
,, 19	25·18¾	20·63	24·29	—		1	$3\frac{31}{32}$	4·83¾	1	$9\frac{5}{16}$	77	9½	2	1¼
Aug. 2	25·21¼	20·64	24·30	1	$4\frac{1}{32}$	1	$3\frac{31}{32}$	4·83½	1	$9\frac{3}{16}$	77	9¼	2	$0\frac{9}{16}$
,, 16	25·22½	20·65	24·31	1	$4\frac{1}{16}$	1	4	4·84	1	$9\frac{1}{16}$	77	9	2	0⅝
,, 30	25·22½	20·67	24·34	1	$4\frac{3}{32}$	1	$4\frac{1}{32}$	4·83½	1	$9\frac{7}{16}$	77	9	2	$0\frac{3}{16}$
Sept. 13	25·22½	20·65	24·34	1	$4\frac{3}{32}$	1	$4\frac{1}{32}$	4·83⅝	1	$9\frac{9}{16}$	77	9	2	0½
,, 27 ...	25·22½	20·67	24·34	1	4⅛	1	$4\frac{1}{16}$	4·83¾	1	$10\frac{3}{16}$	77	9	2	$0\frac{13}{16}$
Oct. 11	25·22½	20·68	24·36	—		1	$4\frac{1}{16}$	4·82⅞	1	10¼	77	9	2	$1\frac{3}{16}$
,, 25	25·28¼	20·74	24·42	—		1	$4\frac{1}{16}$	4·82½	1	$10\frac{9}{16}$	77	9	2	$1\frac{15}{16}$
Nov. 8 ...	25·28¾	20·74	24·41	1	$4\frac{5}{32}$	1	$4\frac{1}{16}$	4·81¾	1	$10\frac{7}{16}$	77	9	2	2
,, 22	25·28¾	20·74	24·45	—		1	$4\frac{1}{16}$	4·82¼	1	10¼	77	9	2	$1\frac{7}{16}$
Dec. 6 ...	25·26¼	20·68	24·39	—		1	$4\frac{1}{16}$	4·82½	1	$9\frac{15}{16}$	77	9	2	1
,, 20	25·26¼	20·68	24·35	1	$4\frac{5}{32}$	1	$4\frac{1}{16}$	4·82⅝	1	10⅛	77	9⅛	2	$1\frac{15}{16}$

* Wednesdays following. † Fridays following.

Vol. LXXIV.] [Part V.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

APRIL, 1911.

SOME STATISTICS *of* JAPAN.

By CHARLES V. SALE.

[Read before the Royal Statistical Society, March 21, 1911, Mr. NOEL A. HUMPHREYS, I.S.O., Vice-President, in the Chair.]

PART I.—*Preface.*

THE coronation of the present Emperor of Japan, in the year 1868, was the starting-point of a new era in the history of that country, signalising the definite abandonment of the rigid conservatism of the past and the adoption of methods of progress and reform. Prior to the accession of that monarch there had been few attempts at statistical record of the details of national life, and very little exact information was available. With the commencement of the new age the returns of revenue and of foreign trade began to be accurately registered, although the tabulation of many other matters was not definitely organised until some years later. Since then considerable material has become available, and I propose to submit some of it for consideration here, after a brief but necessary recapitulation of antecedent historical conditions.[1]

It is sometimes suggested that modern Japan owes her civilisation to Western influences. That is incorrect. Japan was a civilised power before the days of Alfred the Great. We know that prior to the seventeenth century her ports were open to such foreign trade as then existed, that her ships then sailed on every Eastern sea and that her conquering armies invaded Korea and swept their way to the confines of Cathay. The efforts of European missions to add political power to religious influence brought about a violent and excessive reaction, intercourse with the outside world was forbidden, and the forces which might have made Japan a world-power were arrested and subdued for ages. No review of the progress of the past forty years would be complete unless it took full account of the impetus due to the sudden release of energies pent-up for generations past.

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[1] *Japan, its history, arts and literature*, by Captain F. Brinkley, *Things Japanese*, by Basil Hall Chamberlain. *Fifty years of New Japan*, by Count Okuma. *The Population of Japan in the Tokugawa period*, by Garretts Dropper. *A History of Japan*, by James Murdoch, M.A.

As far back as A.D. 650 the country was united under the supreme rule of the Mikado. The administration was organised under a system whose main features are still recognisable. It included a Cabinet, with secretariats and councillors, eight departments of State, local governors, and district headmen. Civil Service examinations were ordered, a superintendent of trade appointed, weights and measures standardised, commerce encouraged, and codes of law promulgated. The State ownership of land was established, steps were taken to improve agriculture, and national defence was assured by a definite military system based on conscription. The beneficial results of these arrangements were, however, of but brief duration. The course of successive reigns was marked by growing indifference to the practical side of royal duty, the Sovereign becoming increasingly engrossed in the pursuit of elaborate pastimes, religious formalities and the promotion of Buddhism. State ownership of land proved a failure, and great numbers of the poorer classes, weighed down by the cost of a swarm of expensive officials and reckless taxation, were driven into serfdom, becoming the vassals of the various provincial functionaries who had risen to wealth and power under the prevailing *régime*.

For over a thousand years from this time, say about the end of the eighth century, Japanese history is a story of perpetual conflict between rival clans, of encroachment upon the prerogatives of the Sovereign, and of the failure of the Emperor to exercise administrative power. It is not, therefore, astonishing that the political power of the Emperor fell into desuetude, and that the military element gained the ascendency. Accordingly we find that some seven hundred years ago the Shogun, or Commander-in-Chief, had already transferred the centre of authority in all secular matters to his own Capital in the north, leaving to the Imperial Court at Kyoto nothing but the functions of official investiture and religious ceremonial, and buttressing his own rule by a system of feudalism through military Governors, each administering a particular district. Naturally enough, at a time when means of communication were in their infancy, it was not long before these functionaries assumed the status of hereditary feudal chiefs, whose allegiance to the central power was but a nominal affair, and whose frequent disputes reproduced the anarchy of former times. After some hundreds of years of storm and stress there came, however, nearly three centuries of comparative peace. The 237 military chieftains who held the land in fee agreed to the headship of Tokugawa Iyeyasu, in the year 1603, and on his investiture as Shogun by the Mikado his office was declared hereditary, the authority of the State was again centralised so far as political matters were concerned, and the claims of rival clans were as much as possible balanced by ingenious counterpoises.

The general policy of the Tokugawa Shogunate throughout the two hundred and sixty-four years of its continuance was one of a negative character. Every change, however intrinsically desirable, was bitterly opposed, and every form of individualism, especially the private accumulation of wealth, was relentlessly repressed. State interference with economic activity was carried to such lengths that no man could change his vocation without permission, no man could sell his estate, and no farmer was allowed to vary his crops according to the soil, for he was compelled to produce what the Government decreed. Foreigners were expelled, foreign trade was forbidden, the building of ships of sea-going size was forbidden, and emigration was forbidden under pain of death.

The various feudatories, with a few exceptions, adopted the same *régime* within their narrower borders, discouraging trade and communication with neighbouring territories. Each feudal baron chose for his dwelling some natural stronghold, for which the mountainous character of the country offered valuable choice, and set up obstacles against possible attack; the natural ruggedness of the roads being regarded as a strategic advantage, no steps were taken to improve them, and for the same reason no ferries were allowed on the principal rivers.

The stimulus of foreign trade, with its interchange of commodities, had been withdrawn from the native industries, and internal commerce was strangled by innumerable monopolies, sumptuary rules and restrictions, the proscription of new inventions, and the universal predominance of the military caste.

A variety of causes contributed to a change. The growth of luxury in the cities, the oppression of the feudal chiefs, the corruption and incompetence of officials, and, not least, the renaissance of the literature and the traditions of Ancient Japan (which led many to look on the Shogun as the sacrilegious usurper of the divinely given prerogatives of the Mikado) might be named as conducing to this change, but more potent than all these was the fear of foreign aggression, the danger of which was brought home to the dullest imagination by the advent of the American Fleet in the year 1853. The panic-stricken Shogun virtually abandoned his exalted office as executive head of the nation by formally reporting the coming of the squadron to the Court of Kyoto, and by summoning for the first time a Council of Feudal Chiefs.

The national character of the peril was quickly realised, and all parties recognised the weakness resulting from a divided sovereignty, and, reasserting the ancient Shinto doctrine of the divine origin of the Emperor, besought him to reassume his immemorial rights. Thus it was that the Mikado, who, throughout the centuries of eclipse had remained in theory the head of the State, Son of Heaven, and Fountain of Honour, stepped forth once more, after the lapse of a thousand years, to govern as well as reign.

I have dealt at some length with these events, because some such outline is essential for a correct appreciation of the forces underlying the transformation of Japan, a transformation which, in little more than forty years, has welded into one the warring elements of her people, dissipating their mutual jealousies, and creating, under the guidance of exceptionally wise leaders, that ordered and disciplined patriotism which has raised her from isolation and obscurity into prominence and power.

Under the auspices of those leaders, the Japanese have grafted on the stem of their ancient civilisation the arts and sciences, the inventions and the philosophies of the West; a whole continent of thought and achievement has been explored and annexed—a realm from which they had deliberately excluded themselves during their period of seclusion. But it may be remarked that the renewal of intercourse with the outer world has been due to the same cause as was its refusal in the past, for both policies have sprung from the irresistible demand of the nation for all that is essential to commercial and political independence, that so may be maintained unbroken the continuity of a national existence dating from the dawn of history.

At the same time this preface offers a key to some of the economic tendencies indicated by the various tables submitted for consideration. The comparatively peaceful revolution of 1868 swept away old methods, old laws, old judicial procedure, old social organisation, old institutions, and old administrative machinery. Out of the resulting chaos the leaders of modern Japan have evolved a system of national life, which, despite modifications due to new conceptions, conditions and requirements, and despite the homogeneous character given to it by a single central control, remains in many respects (so tenacious are the influences of the past) an essentially feudal organism.

The ownership of all land and the minerals therein is vested in the State. The peasants pay rent to the State, as in former days they gave tribute to their feudal lords, for the agricultural land which they cultivate, and the State, following in the footsteps of the feudal barons, spares no effort to ensure the production of a sufficient food supply. Just as each feudal baron tried to make his territory self-supporting and self-contained, so does the Japanese Government of to-day. The authorities are constantly urging, both by precept and example, the greatest variety of production and manufacture. The great and valuable forests are worked by the State for its own revenues. The State owns and operates over 6,000 miles of railway, carries on steel works, ship-building yards, explosive works, woollen mills, and factories for other materials required by the army and navy. It also carries on as monopolies the business in salt, tobacco, and camphor. Upon the annexation of Formosa measures were adopted for increasing the growth of sugar cane, so as to abolish the dependence on Java for supplies of sugar. With the annexation of Korea, steps are being taken to encourage the growth of cotton from American seed, and so reduce the present dependence of Japanese mills upon supplies of raw material from America and India. Almost every enterprise throughout the whole empire receives initiative, encouragement, or assistance from the authorities, and traces of the same paternal influence are to be found in most departments of activity. Under the new system the people are better off than in feudal days; they have a greater degree of personal liberty, and the amount of taxation is less than the proportion of the product of their labour taken by the feudal barons, but, as will be seen in Table 49, taxation in Japan is a heavy burden, and this is the price paid by the people for the high position to which as a nation they have attained.

In this manifestation of feudal influence we find both the strength and the weakness of the Japanese nation. By its aid the creators of modern Japan have within the lifetime of His Majesty the present Emperor established uniformly throughout the country many of the conditions, methods, and institutions necessary to a modern State. Take as examples the reforms of currency, weights and measures. In our own country, to say nothing of the empire, the difficulties of simplification and unification seem insurmountable; yet in Japan, with a people steeped in old customs and traditions, the change has been accomplished as by the wand of a magician. It is in such matters that we find indication of the real progress achieved by Japan—the careful and earnest scrutiny of every detail of national economy, the thoroughness of effort to prove that which is good, the mind ready and open to receive and act upon the results—these are the deep and broad foundations of future progress. Much of this work is unseen, much insufficiently appreciated, and it is only fair to add that such great changes within so short a period would probably have been impossible except under the leadership of an all-powerful Central Government, and with a people who from most ancient times have relied on official initiative and guidance.

On the other hand, there are sources of weakness; for instance, in the sphere of commerce and industry, the lack of full scope for individual initiative and individual enterprise. Men look to the Government for aid, and having received it strive to stifle competition. Success depends more on manœuvring for privileges than on a steady persevering struggle against obstacles. As a natural sequence the supply of active, resourceful, self-reliant men of affairs does not keep pace with the demand, hence the timidity of capital and the cry for more and still more Government assistance.

Another element of weakness lies in the antagonism engendered by the apparently national character of Japanese commerce. There is a feeling abroad that wherever Japanese influence becomes predominant it will follow the same course as in Japan, that is to say, State aid of some kind will be forthcoming so that every step becomes part of an organised national effort, against which no individual trader of any other nationality can hope to compete with profit to himself. It is a fear increased by the tendency of Japan's admirers unduly to magnify her progress and to build on it the prophecy of still greater victories, losing sight of the obstacles to further advance brought into existence with each forward step. Whatever justification there may be for these fears in particular instances, it will be useful to afford means for correctly estimating the proportions of Japanese competition as a whole, and therefore in connection with several of the following tables corresponding British statistics are quoted. These appear to show that though in matters of commerce the Japanese figures of to-day compare marvellously with those of forty years ago, yet in absolute volume their progress, when compared with that of our own trade, is still relatively small, and quite insufficient as a cause for alarm either at present or in the near future.

PART II.—*Area and population.*

Japan is frequently described as a small country, but the particulars set forth in Tables 1, 2 and 3 justify the Japanese in naming it "Dai Nippon," that is to say, "Great Japan."

In addition to the extensions of eminent domain within recent years, mentioned in the footnotes to Table 1, the Japanese have also obtained certain rights in Southern Manchuria. These expansions of territory and influence are stimulated by the increase of population, amounting to over half a million per annum in Japan proper, and it is the declared policy of the Government to encourage emigration to these new territories and spheres of influence, thus to concentrate their people under the national flag, and, at the same time, to leaven the inhabitants with Japanese ideals.

With regard to Table 2, it may be remarked that a periodical census was ordered in the year 1721, and the figures given in brackets for that and succeeding years represent the respective enumerations, but as the military classes (Samurai) and their dependents, together with certain others, were not included in the returns, the larger total is probably more nearly correct. The same table shows that the great increase in population dates from the abandonment of the feudal system and of the policy of exclusion. By the one event the many separate principalities were united under one ruler, and so became a single homogeneous area in which free exchange has since prevailed, and through the other Japan came into contact with the invigorating forces of Western civilisation.

According to the census of 1721, the population numbered about 29 millions. Although peace prevailed and there was no emigration, the net increase during 125 years ending 1846 was only 846,000, or less than one-fortieth of 1 per cent. (0·025) per annum. In the same period the population of England, Scotland, and Ireland advanced from about 10 millions to nearly 27 millions, or over twenty times faster than in Japan. Since 1872, however, when the periodical census was resumed, the Japanese population has increased from 33 millions to very nearly 50 millions, or at the rate of 1·35 per cent. per annum, clear evidence that the previous stagnation was not due to any lack of vitality in the race, but rather to the checks and regulations imposed under the feudal system and the artificial barriers to free trade and inter-communication interposed by the forms and methods of Government. With the removal of these barriers the terrible famines which formerly devastated whole districts are no longer possible. The improved means of transport enable supplies to be sent from one part of the country to another, and in case of a general shortage, imported foodstuffs are obtainable. It may be noted in passing that there are in Japan over 500,000 more males than females.

Table 4 shows the distribution and density of the population. It will be noticed that although the islands of Yezo comprise nearly 25 per cent. of the entire area of Japan proper, they contain only a little more than 2 per cent. of the population.

In Table 5 it will be seen that though in comparison with the United Kingdom the birth-rate is higher in Japan, the death-rate is also higher; thus the annual increase per 1,000 of population is greater in the United Kingdom. This point is worthy of special attention, as there seems to be a general belief in England that the Japanese population is multiplying very rapidly.

From a perusal of Table 6 it will be found that in 1903 only 21 per cent. of the people were living in towns with a population of over 10,000; the corresponding figure for Great Britain in 1901 was 67 per cent. Unfortunately, no complete figures are available after 1903, but the population in the year 1908 of cities over 20,000 being given in the last number of the *Résumé statistique*, it is possible in their case to add the approximate gain since 1903. The average increase in the five years in the population of such cities is 20·5 per cent. compared with 6·1 per cent. for the whole country.

This movement of population to the cities is accompanied by the demand for a higher standard of living, and creates a series of new problems, for instance, the provision of water, roads, sewers and other public works, entailing a much larger municipal expenditure.

TABLE 1.—*Coast line and area.**

	Coast line, miles.	Area, square miles.	Population per square mile.
Japan proper—			
Mainland central	6,630	36,599	—
Mainland northern		30,204	—
Mainland western		20,676	—
	—	87,479	—
Shikoku	1,649	7,033	—
Kiushiu	5,868	16,841	—
Yezo	3,031	36,295	—
	17,178	147,648	335
Dependencies—			
Formosa†	766	13,839	219
Pescadores†	171	48	—
Japanese Saghalien‡	—	12,488	2
Korea §	—	83,650‖	120‖
	—	257,673	243

* This table is based upon the particulars given in *Tenth financial and economic annual*, p. 2, *Résumé statistique*, 1910, pp. 1 and 9, and as regards Korea, in the *Japan Year-book for* 1910, p. 640.

† Ceded by China to Japan in 1895.

‡ Ceded by Russia to Japan in 1905.

§ Annexed in 1910.

‖ Approximate figures.

TABLE 2.—*Population.* Japan proper.*

Year.	Males.	Females.	Total.	Population per square mile.	Increase per cent. per annum.
1721	—	—	(26,061,000) 29,061,000	197	—
'74	—	—	(25,990,000) 28,990,000	196	0·023
'92	—	—	(24,891,000) 27,891,000	189	
1816	—	—	(25,621,000) 28,621,000	194	
'46	—	—	(26,907,000) 29,907,000	202	
'72	16,796,000	16,314,000	33,110,000	224	0·41
'88	20,008,000	19,599,000	39,607,000	268	1·23
'98	22,074,000	21,689,000	43,763,000	296	1·05
1908	25,045,000	24,542,000	49,587,000	335	1·33

Japan's dependencies.

1908.	Formosa	3,036,855
'08.	Japanese Saghalien	26,392
'10.	Korea (annexed to Japan in 1910)....	10,000,000 (approximately)

* This table is based upon the census figures compiled by the Tokugawa Shogunate at intervals of six years, between 1721 and 1846 (*The population of Japan:* Droppers), and upon the census figures quoted in the *Financial and economic annuals* for 1903 and 1910.

TABLE 3.—*Population compared with other countries.**

Countries.	Area.	Population.	Population per square mile.
	Square miles.		
Japan	147,648	49,587,000	335
United Kingdom	121,390	44,538,000	367
Italy	110,660	34,269,000	309
France.................................	207.060	39,252,000	190
Germany........	208,780	62,982,000	301
Japanese Empire	257,673	63,000,000	243
British Empire	11,467,294	396,294,000	35

* This table is based upon the particulars given in the *Statesman's Yearbook* for 1910, pp. xxxiv and xlvi, and the Japanese *Financial and economic annuals.*

TABLE 4.—*Distribution of population.** *Japan proper*, 1908.

		Population.	Number of families.	Average number of units in a family.	Population per square mile.
Mainland	central	19,003,457	3,657,484	5·20	519
	northern	7,480,380	1,090,619	6·86	247
	western	10,929,304	2,259,731	4·84	529
		37,413,141	7,007,834	5·34	428
Shikoku		3,288,290	585,831	5·61	467
Kiushiu		7,748,402	1,379,316	5·62	460
Yezo		1,137,410	277,254	4·10	31
		49,587,243	9,250,235	5·36	335

* *Résumé statistique*, pp. 8 and 9.

TABLE 5.—*Births, deaths, and marriages.*

	Japan.* Average, 1897-1906.	United Kingdom.† Average, 1897-1906.
Marriages	372,848	314,246
,, per 1,000 of population	8·15	7·52
Births	1,432,431‡	1,167,710
Birth-rate per 1,000 of population	31·30	27·95
Deaths	945,102	704,445
Death-rate per 1,000 of population	20·70	16·89
Increase per 1,000 of population due to difference between birth-rate and death-rate	10·60	11·06
Total population	45,742,558§	41,785,572

* *Résumé statistique*, 1910, pp. 14 and 15.

† *Statistical abstract*, 1909 [Cd-5296], pp. 361 and 362.

‡ Exclusive of 143,579 stillbirths.

§ *Financial and economic annual*, 1910, p. 2.

TABLE 6.—*Distribution of population in communities, cities, towns, villages, and rural districts.**

Communities of	1898. Number of communities.	1898. Population.	1903. Number of communities.	1903. Population.	Increase 1903 over 1898.	1908. Number of communities.	1908. Population.	Increase 1908 over 1903.
		1,000's		1,000's	Per cent		1,000's	Per cent.
Less than 500	617	157	451	113	3			
Over 500....	4,050	5,875	3,186	4,647				
,, 2,000....	8,016	24,459	8,059	25,143		Not yet available		
,, 5,000 ..	1,081	6,868	1,342	8,590				
	13,794	37,359	13,038	38,493				
,, 10,000...	153	2,025	186	2,481	22·5			
,, 20,000 ...	60	1,748	64	2,021	25·7	68	2,230	20·5
,, 50,000....	12	773	16	1,077		19	1,352	
,, 100,000....	3	424	3	374		4	530	
,, 200,000...	2	460	2	574		—	—	
,, 300,000....	1	353	2	707		3	1,150	
,, 400,000....	—	—	—	—		1	442	
,, 500,000...	2	2,261	2	2,815		2	3,412	
	—	45,403	—	48,542	6·9			

The respective census figures are :—

1898 = 43,763,855 } The larger totals as per above tables are due to unavoidable
1903 = 46,757,868 } differences in the municipal registers, due to removals, &c.
'08 = 49,587,243 = 6·1 per cent. increase over 1903.†

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* *Résumé statistique*, 1910, p. 11.

† *Financial and economic annual*, 1910, p. 2.

Among the principal features of Table 7 are the large areas belonging to the State, to which reference will be made later, and the fact that forests occupy about 58 per cent. of the total area of the country. Writers upon Japan often refer with surprise to the small percentage of lands devoted to grain and green crops, but if comparison be made with the United Kingdom it will be found that the two countries do not differ so much in that respect as in the proportion of pasture and forest lands. Thus in 1908 :—

	Japan. Acres.	Japan. Per cent. of total area.	United Kingdom. Acres.	United Kingdom. Per cent. of total area.
Grain, green crops, &c.	12,894,000	13·6	12,437,000	16
Grasses and pastures	3,006,000	3·2	34,565,000	44
Forests	55,083,000	58·0	3,070,000	4

These differences are reflected in the small extent of stock farming (see Table 14) and the annual consumption of meat, less than 2 lbs. per head in Japan against 119 lbs. in the United Kingdom.

The area of cultivated land has increased during the last eight years at the rate of about one-half of 1 per cent. per annum, but, as will be seen on reference to Table 2, population is now increasing nearly three times as fast.

TABLE 7.—*Classification of land—Japan proper.*

The only complete statement available is for the year 1900,[2] but it is possible to give the comparative figures for 1908,[3] as far as privately-owned lands are concerned:—

Private ownership (taxable land).	1900.	Percentage of total area.	1908.	Percentage of total area.
Rice fields	12,360,000	13·1	6,989,000	7·4
Fields for other crops			5,905 000	6·2
Plains and pastures	2,633,000	2·8	3,006,000	3·2
Forests	17,146,000	18·1	18,205,000	19·3
Land for dwellings	944,000	1·0	951,000	1·0
Various	69,000	0·1	79,000	0·1
Private ownership (tax exempted)	1,815,000	1·9	1,407,000	1·5
	34,967,000	37·0	36,542,000	38·7
Land belonging to the Court, principally forests	8,993,000	9·5	—	—
Land belonging to the State, principally forests	43,424,000	46·0	—	—
Highways and places under water	7,076,000	7·5	—	—
	94,460,000	100·0	—	—

PART III.—*Prices and wages.*

The progress of a nation is in many respects measured in terms of money, a fair enough standard if the currency has remained unchanged during the period in question. In the case of Japan there have been several changes in currency, and other qualifications touching values must also be taken into account. Under feudal conditions, where each farming household was self-supporting and handed over to the feudal lord a portion of the actual produce, which was in turn distributed among the non-food-producing retainers, very few values were expressed in terms of money. They have come into existence since the abolition of the feudal system in 1871. When this change first took place values were created solely by local conditions, but roads, railways, steamships and telegraphs have gradually brought all parts of Japan into connection with the principal ports, and these through external commerce into close touch with international markets, so that values, especially of the principal grain crops, are now affected and sometimes determined by international conditions. The general effect of this process has been to establish a higher range of money values. Finally, there is the effect of currency changes. At the time the treaties were concluded with Western Powers (1854-59) the ratio between gold and silver prevailing in Japan was approximately 8 to 1, whereas the European ratio was between 15 and 16 to 1.[4] The consequence of this discrepancy was an immediate and large exodus of gold, only checked by temporary measures making the ratio to correspond with that of Europe. In 1871 the coinage system was remodelled, but further changes occurred in the ratio between the two metals in consequence of the world-wide fall in the price of silver.

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[2] *Japan, twentieth century,* pp. 95 and 96.

[3] *Financial and economic annual,* 1910, pp. 50 and 51.

Thus in

1858	8 of silver	= 1 of gold.
'59	15 or 16 of silver	
'71	16 of silver	
'97	32 ,,	

On the basis of this latter ratio the gold standard was permanently established in the year 1897,[5] and since then prices in Japan are no longer affected by fluctuations in the price of silver. The corollary of this reduction in the currency unit of gold to one-fourth of its original weight would be a corresponding increase in prices and wages.

It is impossible to isolate the effects of any one of these factors. Each overlapped the other, and all were retarded in their action until the advent of railways and telegraphs to knit the various provinces into an economic whole. The available price and wages statistics (Table 8) do not commence earlier than 1887, but the following comparison of index-numbers is sufficient confirmation for the assertion that the four-fold or five-fold increase in the money proceeds of taxation does not by any means imply a corresponding increase in the individual burden; it also shows that any estimate of the national progress, where stated in terms of money, is subject to a like qualification.

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[4] *Gold standard*, p. 179.

[5] *Gold standard*, p. 187.

	1887.	1897.	1907.	1908.
Taxes and stamp receipts	100	138	413	412
Price of foodstuffs—				
Rice	100	251	340	324
Barley	100	207	231	260
Wheat	100	203	253	245
Wages—				
Farm labourer (daily)	100	204	261	282
Carpenter	100	194	335	361
Blacksmith	100	182	300	313

TABLE 8.—*Average prices and index numbers of wages and commodities.**

Kind.	Average prices.				Index numbers.			
	1887.	1897.	1907.	1908.	1887.	1897.	1907.	1908.
	Yen.	Yen.	Yen.	Yen.				
Rice per koku	4·71	11·81	16·02	15·24	100	251	340	324
Barley ,,	2·36	4·88	5·46	6·14	100	207	231	260
Wheat ,,	3·89	7·89	9·85	9·60	100	203	253	245
Soya beans ,,	4·07	7·92	10·26	9·30	100	195	252	228
Salt ,,	1·19	3·17	5·24	5·23	100	266	440	439
Saké (rice beer) ,,	13·93	24·20	41·09	43·20	100	174	295	310
Tea per 100 kin	26·09	35·52	44·45	47·80	100	136	170	183
Beef ,,	—	16·69	33·57	35·01	100†	131	264	275
Ginned cotton ,,	18·52	23·87	32·07	30·03	100	129	173	162
Cotton yarn ,,	31·04	31·08	48·27	42·57	100	100	156	137
Raw silk ,,	—	682·00	1077·00	813·00	100†	108	156	129
Silk tissue, kaiki per tan	2·58	4·46	5·73	5·38	100	173	222	209
Petroleum per case	2·02	2·31	3·70	3·94	100	114	183	195
Coal per ton	3·36	6·91	7·70	7·95	100	206	229	237
Charcoal per 10 kwan	0·29	0·73	0·95	1·09	100	252	328	376
Plank, pine per tsubo	0·28	0·61	0·73	0·79	100	218	261	282

Kind of Employment.	Daily Wages.				Index numbers.			
	1887.	1897.	1907.	1908.	1887.	1897.	1907.	1908.
	Sen.	Sen.	Sen.	Sen.				
Tile-roofer	24·3	46·9	87·0	97·0	100	193	358	400
Shipbuilder	22·8	44·0	81·0	83·0	100	193	355	364
Matmaker	21·8	38·7	68·0	74·0	100	178	312	339
Blacksmith	21·7	39·4	65·0	68·0	100	182	300	313
Potter	19·7	30·9	55·0	56·0	100	157	279	284
Printer	17·6	28·2	44·0	47·0	100	160	250	267
Day labourer	16·0	29·0	49·0	53·0	100	181	306	331
Farm labourer (male)	13·8	28·2	36·0	39·0	100	204	261	282
Weaver (male)	12·7	22·5	42·0	44·0	100	177	331	347
,, (female)	7·4	15·0	24·0	24·0	100	203	324	324
Tailor	18·9	30·5	52·0	54·0	100	161	275	286
Carpenter	22·4	43·4	75·0	81·0	100	194	335	361
Plasterer	22·5	43·6	76·0	84·0	100	194	337	373
Stonemason	25·0	47·4	87·0	96·0	100	190	348	384

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* This table is based upon the particulars given in the *Financial and economic annuals.*

† These two index figures are for the year 1895.

PART IV.—*Agriculture.*

Among the distinguishing features of Old Japan was the almost entire dependence of the people upon the primary resources, *i.e.*, agriculture, forests and fisheries, for their means of livelihood and subsistence. With little domestic trade, a very limited foreign trade, restricted lines of communication, the most primitive means of transport and no factories, each district had to be self-supporting and self-sufficient. Not only each district, but, with the exception of the ruling and military classes, each family had to depend almost entirely upon what it could raise and make for itself. As a consequence there was a continual pressure of population upon the means of subsistence; the keenness of the struggle for life under these conditions may be gathered from the stationary character of the population during the centuries before 1872 (see Table 2).

Since the opening of the country to foreign trade and the removal of many restrictions upon individual effort and enterprise, there has been a great increase in production both in quantity and variety, while numbers of people now find a living in providing the means of and carrying on transport, communication, banking, manufactures and other activities.

In spite, however, of all these changes and of the movement towards the cities to which allusion has been made in Table 6, agriculture and the fisheries still form the principal occupations for about 80 per cent. of the people and supply practically all the food requirements of the nation.

In 1908 60 per cent. of the whole population were engaged in agricultural pursuits:—

Totals of households in Japan		9,250,000 [6]
A. Those engaged exclusively in farming	3,748,000	
B. Those combining other occupations with farming	1,662,000	
C. Other farmers, not specified whether Class A or B	70,000	
D. Landowners	43,000	
	5,523,000 [7]	

It will be interesting to students of the land problem in the United Kingdom to know that in Japan land is, under the guise of rent paid to the State, very heavily taxed, that great landlords are almost unknown, that the holdings are small, that each peasant proprietor or farmer works his land intensively with the help of his sons and often of his wife and daughters. Coincident with these

[6] *Résumé statistique*, p. 8.

[7] *Outlines of agriculture*, p. 31.

conditions, or perhaps as a consequence, the price of land, in relation to national wealth, rules higher in Japan than in the United Kingdom.

	£	Per cent. of total national wealth.
United Kingdom[8]—In 1903 "Agricultural land, farms, stock, &c."	1,220,000,000 =	say 11
Japan[9]—In 1904 "Lands, domestic animals, &c."	1,299,000,000 =	„ 57

This comparison is not strictly correct, inasmuch as the Japanese figures do not separate the value of agricultural land from that of land occupied by dwellings, but speaking broadly the omission does not detract from the general proof which it is sought to establish.

Shortly after the feudal barons surrendered their lands to the Emperor in 1871, the title was given to the cultivators, rent being payable to the State in the form of a land tax. Attention may be called to the fact that during the ten years ending June, 1878, the revenues of Japan were practically speaking based upon the "Single Tax" theory, over 90 per cent. of the Government revenue during that period being derived from the land tax. At present the proportion is only about 16 per cent.

Area of farms.[10]	Percentage of farms.
Under 1¼ acres (5 tan)	37·26
From 1¼ to 2½ acres (5 tan —1 cho)	32·61
„ 2½ „ 5 „ (1—2 cho)	19·62
„ 5 „ 12¼ „ (2—5 „)	9·37
Over 12¼ acres (5 cho)	1·14
	100·00

Classification of farmers in 1908.[10]

	Per cent.
A. Landowners	1
B. Landowners who either farm all their own land or farm a portion and let the remainder to Classes C or D	33
C. Landowners who rent land in addition to their own	39
D. Tenant farmers	27
	100

Partly the increase of population and partly the poverty of the former owners an leading to an increase in the number of tenant farmers; 44½ per cent. of the area of land is now cultivated by tenants whose families eke out a living by subsidiary occupations, such as sericulture, weaving, embroidery, straw manufactures, straw and wood chip braids, mattings, hand-made paper, &c. Even so, however, the great majority of the Japanese farming population, old and young alike, must live a most laborious life, enduring unremitting toil in order to make the very barest subsistence.

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[8] *The people's progress*, by Frank Ireson, p. 150.

[9] *National wealth of Japan*, p. 2.

[10] *Outlines of agriculture*, p. 9.

TABLE 9.—*Chief agricultural products, area and crops.**

	1887.		1897.		1907.	
	1,000 acres.	1,000 bushels.	1,000 acres.	1,000 bushels.	1,000 acres.	1,000 bushels.
Rice	6,461	198,396	6,829	163,875	7,120	243,298
Barley, wheat and rye	3,899	78,477	4,286	89,307	4,404	109,757
Millet	67	1,362	68	1,292	75	1,928
Soy bean	1,142	16,139	1,067	15,381	1,156	18,189
Small red bean	249†	2,779†	268	3,069	333	4,592
Italian millet	596	12,771	613	11,880	497	11,673
Buckwheat	388	5,541	427	4,911	408	6,143
Rape seed	410	5,669	378	5,015	351	5,243
Cocoons — Area, mulberry trees Product, cocoons	417†	6,047	731	10,525	958	17,147
	13,629	327,181	14,667	305,255	15,302	417,970
		1,000 tons.		1,000 tons		1,000 tons.
Potato	41	105	71	216	144	544
Sweet potato	543	2,072	635	2,444	720	3,418
Seed cotton	241	82	109	27	18	5
Hemp	36	9	55	13	33	9
Leaf indigo	123	57	124	72	35	23
Tea	123‡	26	144	31	124	27
Tobacco leaf	49‡	22	77	33	78	45
	14,785	2,373	15,882	2,836	16,454	4,071
Total arable area	Not available	—	12,301	—	12,876	—

As two crops per annum are taken from over one-third of the arable area, the crop area exceeds the total arable area, which in 1897 was 12,301,000 acres and in 1907 12,876,000 acres.

* *The financial and economic annuals. Japan, twentieth century. Outlines of agriculture.*

† Relate to 1894.

‡ Estimates only.

The average farm in the three principal islands extends to about $3\frac{1}{2}$ acres, but is frequently divided into a number of small irregularly shaped fields, scattered in various places. To overcome this wasteful division, the Government encourages co-operative redistribution, granting subsidies and privileges for the purpose. So far such readjustments have taken place over an area of 178,000 cho[11] (436,100 acres); the work is, however, seriously hampered owing to lack of funds, the hypothec banks and industrial banks being unable to meet all the applications.[11] The gain in cultivable area, through the removal of needless boundaries, is estimated at 3 per cent.,[12] while the better facilities for irrigation and drainage result in an increased yield, and in some cases render it possible to grow two crops a year instead of one. At the same time the larger fields make it more profitable to use animal labour. This readjustment is eloquent testimony to the painstaking efforts which are being devoted to every possible method for increasing agricultural products. Other means with the same object are the establishment of agricultural experimental stations in every prefecture, the encouragement of farmers' co-operative societies, the establishment of agricultural banks, and a systematic arrangement of agricultural education.

Table 9 shows the general effect of these measures. Apart from a small addition to the cultivated area, there is a large increase in the yield per acre, so that food production has increased faster than the population, which advanced from 39,000,000 in 1887 to 49,000,000 in 1907.

Rice is the principal crop, its value being more than all other agricultural productions taken together. The following figures from pages 39 and 40 of "Outlines of agriculture in Japan" verify the conclusions derivable from Table 9 :—

TABLE 10.—*Increasing production of rice.**

Annual average for years	Average annual production.	Bushels per acre.
	Bushels.	
1883–87 …………	167,003,000	26·11
'88–92 …………	192,746,000	28·73
'93–97 …………	186,843,000	27·49
'98–1902 …………	210,651,000	30·31
1903–07 …………	229,549,000	32·45

* The increase shown in this table is all the more striking if comparison be made with earlier periods :—

1688 ……………………. 25,750,000 koku = 127,720,000 bushels.
1836 ……………………. 31,500,000 ,, = 156,240,000 ,,

Brinkley's *Japan*, vol. 4, p. 265.

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[11] *Outlines of agriculture*, p. 23.

[12] *Japan year-book*, p. 286.

The same increasing yield attends the cultivation of other crops, and the comparison between increase of population and increase of grain crops, expressed in index numbers, is :—

TABLE 11.—*Comparative increase of population and grain crops.**

Average of years.	Population.	Rice, barley, wheat and rye.	
		Area.	Production.
1888-92	100·0	100·0	100·0
'93-97	105·4	102·5	103·7
'98-1902	110·7	104·9	115·5
1903-07	117·8	106·1	120·8

* *Outlines of agriculture*, p. 43.

The agricultural experimental stations established in every prefecture anticipate still further increases in the yield—40 per cent. in the case of rice, and about 75 per cent. in the case of barley, rye, and wheat.

The steps necessary for such increased yields are such as can be taken by any ordinary farmer—deep ploughing, the selection of seeds, improved methods of cultivation and precautions against diseases and injurious insects. The same authorities believe that it will be possible to bring materially wider areas under cultivation and look forward with confidence to the production of sufficient food for a much larger population. The measure of success already achieved through the efforts of the agricultural experiment stations appears to justify these optimistic ideas, but against this view must be set the growing demand for more and better food, especially in the cities and amongst those engaged in industrial labour. In this connection, the comparative production of the principal agricultural food crops is worthy of notice. In the case of the United Kingdom, the fodder crops are included, because they represent an ultimate supply of food-stuffs in the shape of milk, butter, meat, &c.

	Japan (population 48,815,000).	United Kingdom (population 44,100,000).
Production in 1907—		
Rice, wheat, barley, oats	372,800,000 bushels	307,312,000 bushels
Potatoes	3,962,000 tons	5,223,000 tons
Turnips, swedes, &c. (United Kingdom)	Very little	36,300,000 tons
Radishes (Japan)	2,300,000 tons	—
Hay	Very little	15,600,000 tons
Net import of food, drink, and tobacco	£3,460,000	£212,390,000

It will be useful, especially in considering at a later stage questions of taxation and Government expenditure, to show the value of agricultural products. The only complete official table appears to be that which follows in Table 12, copied from page 42 of the "Outlines of agriculture in Japan."

TABLE 12.—*Average annual value of agricultural products for* 1905-07.

Products.	£'s sterling.
Rice	65,013,780
Barley	5,277,480
Naked barley	5,695,680
Wheat	3,897,420
Soy bean	3,528,180
Small red bean	1,018,980
Indian millet	1,766,640
Buckwheat	604,860
Sweet potato	3,465,960
Potato	758,880
Rape seed	1,267,860
Leaf tobacco	944,520
Raw silk	13,999,500
Tea	1,046,520
Silkworm egg	944,520
Sugar	1,097,520
Mats and matting	987,360
Vegetables	5,026,560
Fruits	3,120,180
Poultry and its products	1,673,820
Cattle and its products	1,822,740
Miscellaneous	3,039,600
	£125,998,560

It is, however, important to find some comparison with the values in earlier years, and Table 13 has therefore been compiled, the particulars being collated from the *Financial and economic annuals.*

TABLE 13.—*Value of some of the principal crops.**

	1887.		
	Koku.	Price.	Total value. Yen.
Rice	39,999,000	4·71	188,395,000
Barley	15,822,000	2·36	16,760,000
Wheat		Est.	12,000,000
Rye		,,	17,000,000
Soy bean	3,254,000	4·07	13,243,000
	kwan.		
Tea	7,011,000	1·63	11,429,000
Silk (raw)	1,013,000	Est.	28,000,000
	—	—	286,827,000
		Say, £45,500,000†	

	1897.		
	Koku.	Price.	Total value. Yen.
Rice	33,039,000	11·81	390,190,000
Barley	8,028,000	4·88	39,176,000
Wheat	3,811,000	7·89	30,068,000
Rye	6,165,000	6·83	42,106,000
Soy bean	3,100,000	7·92	24,552,000
	kwan.		
Tea	8,471,000	2·22	18,806,000
Silk (raw)	2,166,000	Est.	60,000,000
	—	—	604,898,000
		Say, £61,700,000†	

	1907.		
	Koku.	Price.	Total value. Yen.
Rice	49,052,000	16·02	785,813,000
Barley	10,133,000	5·46	55,326,000
Wheat	4,453,000	9·85	43,862,000
Rye	7,541,000	8·00	60,328,000
Soy bean	3,667,000	10·26	37,623,000
	kwan.		
Tea	7,312,000	2·77	20,254,000
Silk (raw)	3,227,000	Est.	140,000,000
	—	—	1,143,206,000
		Say, £116,600,000†	

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* The quantities are taken from *Japan, twentieth century*, p. 180, and the *Financial and economic annuals.* The prices are those given in the same volumes, under the heading "Prices of principal commodities."

† In 1887 the average rate of exchange was 3*s.* 2*d.* per yen (6·30 yen = £1 sterling). In 1897 and subsequent years it was fixed under the gold standard at approximately 2*s.* 0½*d.* per yen (9·804 yen = £1 sterling).

TABLE 14.—*Number of domestic animals.**

Year.	Cattle.	Horses.	Sheep and goats.	Swine.
1888	1,011,000	1,530,000	Not specified.	
'98	1,230,000	1,588,000		
1908	1,298,000	1,495,000	87,000	285,000
Corresponding figures for United Kingdom in 1908†	11,739,000	2,089,000	31,332,000	4,055,000

* *Financial and economic annuals*, 1903, p. 47; 1910, p. 57.
† *Statistical abstract* [Cd–5296], No. 57, p. 295.

Speaking generally, agriculture in Japan shows considerable progress, but the results are not compatible with the large number of people engaged. The Agricultural Bureau of the Japanese Department of Agriculture and Commerce estimates the value of agricultural products at £126,000,000, and the number of farm labourers, including peasant proprietors, at 11,500,000.[13] According to the census of 1901, the number similarly engaged in the United Kingdom was 2,053,993, while the value of agricultural products for that year was estimated by Sir Robert Inglis Palgrave to be £174,800,000.[14] With less than a fifth the number of labourers, the product in the United Kingdom is larger, and 40 per cent. greater in value. It seems impossible to avoid the conclusion that this enormous waste of human labour in Japan is due to the absence of land-owning capitalists and the prevailing system of peasant proprietorship with farms so small that they neither yield to the proprietor a sufficient return to permit the accumulation of capital nor allow the use of labour-saving implements. In an interesting article on "Farm machinery and production,"[15] D. H. W. Quaintance estimates that the employment of machinery in the United States has decreased the amount of labour required in the production of nine principal crops by 79 per cent., and that while higher wages are now paid, the actual labour cost of the product has been reduced by 50 per cent. during the last half of the nineteenth century. Such figures cast an interesting light on the possibilites in store for Japanese agriculture when the problem of cheaper production is seriously taken in hand. According to "Outlines of agriculture," the production of rice upon 1 acre of land requires 110 days' labour in Japan; whereas, in Texas and Louisiana, the labour of a man for 2 days, and the use of a team for 1½ days, form the maximum expenditure of effort on 1 acre of rice (*American Economic Association Journal*, 1904, p. 108).

[13] *Outlines of agriculture*, pp. 42 and 43.
[14] *Journal*, vol. lxviii, part 1, March, 1905.
[15] *Journal of the American Economic Association*, vol. 5, November, 1904.

PART V.—*Forestry.*

Forestry affords a subsidiary occupation to many of the farming class and therefore takes a place directly after agriculture. About 60 per cent. of the area of Japan is occupied by forests, the ownership in 1908 being distributed as follows:—

	Acres.
Owned by the State	29,186,850
„ Crown	5,152,350
„ Communities and Temples	6,632,150
„ Private owners	14,112,000
	55,083,350 [16]

The importance of forestry has been recognised from very early times, and during the Tokugawa *régime* (1603-1867), the most stringent protective rules were enforced. Inasmuch as wood was the only fuel and the only building material, whether for houses or boats, it was necessary that each feudal domain should secure a constant supply of the different timbers within its own borders. Hence arose the practice of regarding the production of timber in the same light as that of crops, and of enforcing a certain rotation with given periods for cutting and replanting. With the fall of feudal Government these restrictions were removed, and for a time there was much reckless felling of timber, especially where it was within easy reach of a market, but in the year 1882 draft forest laws were prepared by officers who had been trained in Germany, and in 1899 the general Forest Law was promulgated. Under this law the State and Crown forests are administered and the cutting of other forests is regulated.

TABLE 15.—*State forests.*

Year ending March 31.	Sale of products.	Rents and other income.	Total revenue.	Expenditure.*	Net revenue.	Sale of forests and plains.
	£	£	£	£	£	£
1900	185,771	11,109	196,882	—	—	103,734
'05	291,480	16,812	308,292	—	—	240,208
'07	430,022	127,793	557,816	206,559	351,257	377,667
'09	466,415	502,394	968,811	414,015	554,795	379,978

* The figures in this column are taken from the table of State expenditure, page 29, of the *Tenth financial and economic annual*, the other columns from page 51 of the same volume.

Hitherto, the Forestry Bureau has been principally engaged in laying down the system of management and control. The country is divided into 10 districts with 270 local offices and 1,259 sub-offices.[17] The State forests are all to be managed as a trading concern, small isolated areas are being sold so as to consolidate the estates, and a very considerable amount of replanting is being undertaken—about 100,000,000 trees[18] per annum. The revenue from State forests is expected to increase year by year, and to amount to some millions sterling per annum within two or three decades. The progressive nature of the State income in this respect is shown in Table 15.

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[16] *Résumé statistique*, pp. 29 and 30.

PART VI.—*Fisheries.*

The development of fisheries has kept pace with that of agriculture and forestry. They did not receive much attention from the Government until about 1893, so that early statistics are not available.

TABLE 16.—*Chief marine products.**

	Raw fish.	Manufactured products, dried fish, guano, &c	Salt.
	£	£	£
1894	2,016,075	1,843,192	355,274
'97	3,157,426	3,033,516	1,030,686
1902	5,690,898	3,020,000	904,696
'07	7,563,570	4,324,669	1,047,414

* *Financial and economic annuals.*

There is nothing in the official returns to indicate whether the values in the second column are additional to those in the first column. None of the figures can, however, be more than a very rough estimate, probably much below the mark, inasmuch as the fish are not landed at a few great ports, but in every little seaside village reaching along a coastline of over 17,000 miles. (Table 2.) In recent years Japanese fishermen have extended their operations to the maritime provinces of Russian Siberia and the Korean Seas. The improvements in the type of fishing boats, in tackle, and in methods give reason for believing that this industry may become a larger source of income than at present.

The fisheries are second only to agriculture as regards the numbers to whom they afford occupation. According to the *Tenth Financial and economic annual* in the year 1908:—

Those engaged exclusively in the fisheries	810,717
Those who combine fishery with other occupations	930,053
Number of boats engaged	427,685
Value of product (see Table 16 and the above remarks) .... say	£11,890,000

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[17] *Fifty years of new Japan*, p. 586.

[18] *Japan year-book*, p. 331.

The corresponding figures for the United Kingdom (1908) are given on pp. 65 and 66 of "The Statesman's Year-Book":—

Men and boys employed		105,922
Number of boats engaged		23,812
Value of fish landed		£10,512,431
Weight of fish landed	tons	1,129,376

As in agriculture, this comparison exhibits a lavish expenditure of labour in Japan. The great difference in the number of boats is accounted for by the much larger average size of those in use on the British coasts, many of them steam vessels able to keep the sea in all weathers and venturing out much further from shore.

PART VII.—*Mining.*

Since the days of Marco Polo Japan has been regarded as a country rich in minerals, but judging from the experience of the last thirty years it would appear that there are very few large deposits, although a great variety of minerals is found distributed throughout the Empire. The mining of gold, silver, copper, lead and zinc dates from ancient times, but mining as a national resource has only assumed importance during the last few years (see Table 17).

The values of the products prior to 1887 inclusive are not available, but the quantities alone are sufficient indication of the progress made in the more recent years. As regards iron there seems very little probability that Japan will ever produce more than a fraction of her requirements; the supplies of ore are apparently too small and too poor in quality to compete with those procurable at lower prices from the vast ore-beds of China. The greatest advance shown in the table is in the output of coal, which increased by 9,000,000 tons in the decade ending with 1907. The corresponding increase in the output of the United Kingdom for the same years was 65,000,000 tons.

According to Japanese law the ownership of land does not carry the right to minerals which it may contain; priority of application gives title to the right of prospecting, which is granted for limited periods against payment of a small tax to the State. A licence for permanent mining entails a larger annual tax and a royalty to the State upon the product. The activity in prospecting is well shown by the annual number of applications for trial mining. (See Table 18.)

TABLE 17.—*Chief mineral products.**

	1877.		1887.	
	Ozs.	Yen.	Ozs.	Yen.
Gold	11,264	439,000	16,740	652,000
Silver	355,143	—	1,145,233	—
	Tons.		Tons.	
Copper	3,897	1,285,000	10,892	2,630,000
Lead	268	—	380	—
Iron	8,085	—	15,024	—
Iron pyrites	—	—	—	—
Antimony	21	—	1,530	123,000
Manganese	13	—	305	—
Coal	499,106	1,926,000	1,746,296	5,937,000
Sulphur	1,304	—	10,613	—
	Gallons.		Gallons.	
Petroleum	401,525	—	1,203,029	—
Total	—	—	—	—

	1897.		1907.	
	Ozs.	Yen.	Ozs.	Yen.
Gold	33,330	1,368,000	94,460	3,917,000
Silver	1,745,743	2,082,000	3,073,729	4,223,000
	Tons.		Tons.	
Copper	20,072	8,693,000	39,558	33,700,000
Lead	759	103,000	3,031	568,000
Iron	27,544	1,002,000	51,112	2,635,000
Iron pyrites	7,504	32,000	55,268	203,000
Antimony	1,152	274,000	244	144,000
Manganese	15,181	87,000	20,266	144,000
Coal	5,188,157	18,996,000	13,803,969	59,961,000
Sulphur	13,371	336,000	32,811	789,000
	Gallons.		Gallons.	
Petroleum	9,179,434	444,000	60,105,562	5,219,000
Others	—	39,000	—	512,000
Total	—	33,456,000	—	112,015,000
	say, £3,413,000		say, £11,426,000	

* *Financial and economic annuals,* 1902, 1904, 1907, 1909. *Japan, twentieth century,* pp. 305—317.

TABLE 18.—*Number and area of concessions.**

	Prospecting concessions.		Mining concessions not being worked.		Mining concessions in work.		Total number of mine employees.
	Number.	Area in acres.	Number.	Area in acres.	Number.	Area in acres.	
1893	5,700	684,913	1,522	60,677	1,991	95,162	—
'98	3,959	1,376,857	2,570	201,871	2,700	211,336	132,731
1903	5,850	1,900,033	3,319	391,796	2,539	306,950	157,129
'08	5,177	1,526,558	3,577	461,253	1,997	389,599	202,589

* *Financial and economic annuals,* 1910, pp. 61 and 62; 1906, pp. 65 and 66 1903, pp. 46 and 47.

Table 19 is added to illustrate once more the fact that cheap labour does not necessarily mean cheap production.

TABLE 19.—*Coal mines and production of coal.**

Year.	Number of coal miners.	Number of days worked in coal mines.	Number of days per employee.	Coal raised.	Tons of coal per miner per annum.	Value.	Value per ton.
				Tons.		£	*s.* *d.*
1896....	53,751	13,294 000	247	5,059,000	94	1,313,000	5 2
'98....	75,831	17,372,000	229	6,749,000	89	2,767,000	8 3
1903....	84,941	22,258,000	262	10,138,000	119	2,963,000	5 10
'08....	126,999	34,068,000	268	14,825,000	117	6,490,000	8 9

* *Financial and economic annuals*, 1906, pp. 65 and 66; 1907, p. 66; 1910, p. 62; and *Japan, twentieth century*, pp. 296 and 299.

The comparative figures for the United Kingdom and Japan in the year 1908 are:—

	Japan. Year 1908.	United Kingdom.* Year 1908.
Number of coal miners underground† ...	126,999	796,329
Coal raised, in tons	14,825,363	261,528,795
Tons of coal per miner per annum	117	328
Value sterling	£6,489,624	£116,598,848
„ per ton........	8*s.* 9*d.*	8*s.* 11*d.*
Tons of coal exported	2,863,116	62,547,175
Value per ton exported........	12*s.* 11*d.*	12*s.* 8*d.*

* *Mines and quarries* [Cd–5413], pp. 159, 191 and 196.

† The Japanese statistics do not specify whether the total refers only to employees underground, but the point is not of much importance.

PART VIII.—*Water power.*

No review of Japanese resources would be complete without mention of the vast energy available for hydro-electric power; the heavy rainfall averaging over 60 inches per annum, and the configuration of the country giving rise to many streams which can be utilised in this manner.

Leaving the old-fashioned water wheels entirely aside, there were 174 engines worked by water power in 1905, the total h.p. being 20,168. Within three years, that is to say 1908, these figures had increased to 238 engines, with a total h.p. of 49,819, made up as follows:—

Textile factories	31	3,586
Chemical factories........	47	10,972
Electrical companies........	17	14,620
Metal refiners........	136	20,550
Sundries	7	91
	238	49,819*

* *Tenth financial and economic annual.*

These are still quite small figures, but the possibilities of this source of power are valuable to the manufacturer, because coal is comparatively speaking an expensive fuel, owing to the cost of transport from the collieries to the factory districts.

PART IX.—*Railways.*

The method adopted for providing the country with a system of railways is typical of the manner in which Japan, by means of careful forethought and systematic planning, often makes the best use of limited means, avoiding needless expenditure and wasteful competition. A comprehensive plan was first prepared by the Government for railways extending to all the principal points. It was at first intended that all construction should be undertaken by the Government, but lack of money proving an insurmountable obstacle to rapid progress, private enterprise was encouraged to apply for charters in respect of any section belonging to the general plan. Once the public were educated to the profitable possibilities, development proceeded rapidly until 1905, when nearly 5,000 miles were in operation, of which over two-thirds belonged to private companies.

This policy of building to a national plan avoided the fruitless expenses of promotion and prevented useless competition, but naturally those links which did not promise an early or sufficient return were left to be constructed by the Government. In course of time, as the various sections were completed and connected, differences of administration became apparent, and though with patience these might have been satisfactorily arranged, they were utilised by the military party as an argument for nationalisation, and finally in the year 1906 the Diet authorised the Government to purchase the principal private undertakings. Within a very short time the negotiations were completed, and the entire system of railways linked together under State management. The railways so transferred aggregated 2,823 miles,[19] the construction cost was about £23,456,000.[20] The purchase price, payable in national bonds bearing 5 per cent. interest, was twenty times the average percentage of profits during the three years preceding the agreement. On this basis the total payments to the companies were £48,788,000.[21]

Although relative to construction cost the price paid may seem high, yet the great advance in the price of land and of commodities, as well as of labour, makes it certain that similar properties could not be constructed to-day for anything like the amounts which the Government has paid; hence, while the shareholders have received a good return, the Government have secured a great bargain.

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[19] *Tenth financial and economic annual*, p. 162.

[20] *Ninth financial and economic annual*, p. 158.

[21] *Tenth financial and economic annual*, p. 162.

It is still too early to express an opinion as to whether State operation will be as satisfactory to the general public as private management. Naturally, the men who are first appointed to control such departments of Government are keener, more energetic and more disposed to study public requirements than their successors. Even at this early stage there is, however, some reason for believing that the private companies if left in possession would have been more progressive; the easy monetary conditions which have ruled since 1908 would have favoured further large investments in this form of enterprise for reconstruction as well as increased mileage. As it is, the Government, bound by the voluntary declaration to economise in all expenditure, even of a productive character, until the national debt is considerably reduced, have been compelled to curtail extensions and improvements, as may be clearly seen from a perusal of Table 20.

A feature of importance noticeable in Table 21 is the increasing volume of goods traffic; this is bringing into prominence the limitations of the present 3 ft. 6 in. gauge, and expert opinion inclines to the belief that it will soon be necessary to reconstruct the entire system on a broader gauge. Taking State and private railways together the average working expenses in 1888 were equal to about 37 per cent., whereas in 1909 these had grown to over 53½ per cent. of the total receipts—a proof of the manner in which wages and costs are rising with each step on the path of progress.

All the following tables relate to the railways in Japan proper, but the Government interests in railways extend to other parts of the Empire. The following is a summary of the mileage which constitutes a very important and valuable Government asset:—

Railways in Japan[22]	4,543	miles.	
,, Formosa[23]	271	,,	
,, Korea[24]	641	,,	
,, South Manchuria[25]	706	,,	($\frac{5}{8}$ths of the paid-up capital).
	6,161		

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[22] *Tenth financial and economic annual*, p. 150.

[23] *Tenth financial and economic annual*, p. 179.

[24] *Japan year-book*, p. 653.

[25] *Tenth financial and economic annual*, p. 162.

TABLE 20.—*Railway mileage and rolling stock.**

For the year ending Mar. 31.	Mileage open to traffic.			Rolling stock.		
	State. Miles.	Private. Miles.	Total. Miles.	Engines.	Passenger carriages.	Freight wagons.
1872....	18	—	18	10	58	75
'88....	300	293	593	83	451	1,251
'91...	550	848	1,398	254	1,217	3,387
'93....	661	2,287	2,948	894	2,900	11,471
1906 ..	1,532	3,251	4,783	1,717	5,340	27,183
'08....	4,453	445	4,898	2,037	5,666	33,609
'09....	4,542	478	5,020	2,156	5,956	34,045

The respective figures for the United Kingdom in 1909 were:—

—	—	—	23,280	22,778	52,919	786,653†

* *Financial and economic annuals*, 1902, 1910. *Railway returns*, Cd–5293.

† This is exclusive of wagons belonging to private traders which are estimated to number about 650,000.

TABLE 21.—*Traffic receipts of State and private railways.**

Year ending March 31.	Passengers.			Average per passenger.		
	Number.	Traffic mileage.	Receipts.	Mileage.	Receipts.	Receipts per mile.
		Miles.	£	M.C.	Pence.	Pence.
1891........	22,841,000	470,300,000	824,000	20·47	—	—
'98........	85,098,000	1,462,454,000	1,725,000	17·15	4·88	0·28
1908	141,006,000	2,808,551,000	4,291,000	19·72	7·33	0·37
'09........	146,973,000	2,922,614,000	4,553,000	19·71	7·45	0·38
	Goods.			Average per ton.		
	Weight.	Traffic mileage.	Receipts.	Mileage.	Receipts.	Receipts per mile.
	Tons.	Miles.	£	M.C.	Pence.	Pence.
1891........	1,560,000	65,973,000	284,000	42·23	—	—
'98........	8,628,000	412,382,000	828,000	47·63	23·00	0·48
1908........	23,515,000	1,577,635,000	2,857,000	67·08	30·00	0·44
'09........	25,455,000	1,856,160,000	3,732,000	72·73	35·00	0·48

The figures in the columns headed "Receipts" are less than those in Table 23. The discrepancy is due to the omission of minor sources of revenue.

* *Financial and economic annuals*, 1904, p. 130; 1910, p. 155.

Owing to a difference in statistical methods it is only possible to compare with the United Kingdom in the following respects (year 1909):—

		Japan.*	United Kingdom.†
Passengers	number	146,973,000	1,265,081,000‡
Goods traffic	tons	25,455,000	499,900,000
Passenger receipts	£	4,552,000	51,205,000
Goods traffic receipts	£	3,732,000	59,477,000
Total receipts (all sources)	£	8,536,000	120,174,000
Working expenditure	£	4,576,000	75,038,000
Total net earnings	£	3,960,000	45,136,000
Paid-up capital	£	80,038,000	1,314,400,000
		Per cent.	Per cent.
Percentage of working expenditure	1888	37	52
	1909	53½	62

* *Financial and economic annual*, 1910, pp. 154 and 155.
† *Railway returns of the United Kingdom*, year 1909, p. xix.
‡ Exclusive of 730,273 season ticket holders.

TABLE 22.—*Earnings and expenses per mile of railway for the year* 1907.*

	Japan.	United Kingdom.
Earnings—	£	£
Passenger receipts	945	2,206
Freight, &c.	745	2,648
Total	1,690	4,854
Expenses—		
Maintenance	190	487
Repairs and renewals of carriages and wagons	—	270
Motive power	379	934
Traffic	250	944
Rates, taxes and Government duty	—	228
General	49	270
Total	868	3,133
Net earnings	822	1,721
Average earnings per train mile—	Pence.	Pence.
Earnings	43·85	62 85
Expenses	22·54	40·56
Net	21·31	22·69
Percentage of expenses	51·40 per cent.	63·00 per cent.

* *Japan railway annual*, year 1907. *Railway returns of the United Kingdom.*

TABLE 23.—*Revenue and expenditure of State and private railways.**

Year ending March 31.	Average mileage open to traffic.			Total receipts.	Working expenditure.		Net receipts.
	State.	Private.	Total.		Total.	Proportion to total receipts.	
				£	£	Per cent.	£
1888	235	238	473	443,264	164,564	37·12	278,700
'98	647	2,027	2,674	2,705,809	1,261,138	46·60	1,444,671
1908	3,980	936	4,916	8,322,622	4,277,687	51·40	4,044,935
'09	4,512	452	4,964	8,536,234	4,576,449	53·61	3,959,784

* *Financial and economic annual*, 1910, p. 156.

PART X.—*Shipping.*

During a period of about two hundred and twenty years ending in 1861 it was forbidden to build ships of any size or to trade abroad, but since the repeal of those laws the Mercantile Marine of Japan has made steady progress until it now ranks sixth in comparison with other steamship owning countries.

Steamers 100 *tons gross and upwards.**

Flag.	Gross tonnage.	Flag.	Gross tonnage.
British	18,059,037	French	1,448,172
German	3,959,318	Norwegian...............	1,422,006
American (including Great Lakes	3,827,014	Japanese	1,146,977

* *Lloyd's Register* for 1910, p. 889.

Table 24 exhibits the progressive increase of the Japanese Fleet. In Table 25 it will be noted that a large percentage of the vessels are well past middle age. This reveals one of the causes of the rather rapid increase in Japanese tonnage, namely, the purchase of second-hand steamers (principally British) at very low prices and the ability to run them under the Japanese Flag at a low rate of expense. It is, however, interesting to note that under the new tariff, effective in July, 1911, a comparatively high duty is to be levied on second-hand vessels so that British shipowners may perhaps look forward to less competition from this source. Table 26 is interesting because it shows the extension of Japanese shipping interests in the Chinese trade; Table 27 indicates the manner in which Japan is taking possession of the carriage of merchandise to and from her own ports, due to the very liberal subsidies both for shipbuilding and navigation, to which reference is made in Part XI.

TABLE 24.—*Tonnage owned by Japan.**

At end of year.	Steamers.			Sailing vessels.		
	Number.	Gross tons.	Average tonnage.	Number.	Gross tons.	Average tonnage.
1872	96	23,364	243	35	8,320	238
'82	314	42,199	123	428	48,985	114
'88	524	129,836	248	896	67,529	75
'98	1,130	477,430	423	1,914	170,894	89
1903	1,570	663,220	422	3,934	328,953	84
'08	2,304	1,160,440	504	5,379	384,481	71
'09	2,360	1,198,098	508	5,880	403,203	69

* *Financial and economic annuals*, 1903, p. 155; 1910, p. 164.

TABLE 25.—*Number and tonnage of steamers classified according to size and age*, 1909.*

Gross tonnage.	Number.	Gross tons.	Age.	Number.	Gross tons.
20 tons to 200 tons....	1,033	74,749	Under 5 years	408	221,617
200 ,, 500 ,, ...	141	48,600	5 to 10 ,,	375	174,270
500 ,, 1,000 ,, ...	140	102,533	10 ,, 15 ,,	310	201,060
1,000 ,, 2,000 ,, ...	127	195,110	15 ,, 20 ,,	193	123,737
2,000 ,, 3,000 ,, ...	105	256,955	20 ,, 25 ,,	137	164,779
3,000 ,, 4,000 ,, ...	52	177,122	25 ,, 30 ,,	116	159,684
4,000 ,, 5,000 ,, ...	18	80,104	Over 30 ,,	52	59,106
5,000 ,, 6,000 ,, ...	6	31,975	Unknown	62	85,704
6,000 ,, 7,000 ,, ...	22	137,388			
7,000 ,, 8,000 ,, ...	1	7,463			
8,000 ,, 9,000 ,, ...	6	51,078			
Over 9,000 tons	2	26,880			
Total	1,653	1,189,957†	Total	1,653	1,189,957†

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* *Financial and economic annual*, 1910, pp. 165 and 166.

† The difference in number and tonnage compared with Table 24 is due to the omission of vessels below 20 tons.

TABLE 26.—*Japanese and other shipping entered at Chinese ports.**

Flag.	1896.		1902.		1907.		1909.	
	1,000 tons.	Per cent.	1,000 tons.	Per cent.	1,000 tons.	Per cent.	1,000 tons.	Per cent.
British	21,847	65·23	26,950	49·94	33,316	41·59	34,027	39·22
Chinese	7,251	21·65	9,341	17·30	16,686	20·83	17,861	20·58
Japanese....	566	1·69	7,350	13·61	15,598	19·47	18,949	21·84
German	1,945	5·81	7,220	13·37	6,639	8·29	7,244	8·35
French	434	1·29	833	1·54	4,712	5·88	4,920	5·66
Others.......	1,447	4·33	2,296	4·24	3,158	3·94	3,771	4·35
	33,490	100·00	53,990	100·00	80,109	100·00	86,772	100·00

* *Returns of trade, Imperial Chinese Maritime Customs, for* 1896, p. 20; 1902, p. 20; 1907 and 1909, p. 18.

TABLE 27.—*Tonnage of steam vessels entered from foreign countries.**

Year.	Japanese.		British.		French.		German.	
	Tons.	Per cent. of totals.	Tons.	Per cent. of totals.	Tons.	Per cent. of totals.	Tons.	Per cent. of totals.
1878	102,000	22·54	175,000	38·65	43,000	9·52	7,000	1·47
'88	214,000	17·44	543,000	44·24	78,000	6·29	215,000	17·52
'98	2,085,000	26·74	3,934,000	50·47	287,000	3·70	663,000	8·51
1908	8,630,000	42·92	6,401,000	31·83	430,000	2·14	1,848,000	9·20
'09	9,498,000	48·28	5,809,000	29·54	311,000	1·58	1,629,000	8·30

Year.	Austro-Hungarian.		Norwegian.		United States of America.		Other countries.		Total tons.
	Tons.	Per cent. of totals	Tons.	Per cent. of totals.	Tons.	Per cent. of totals.	Tons.	Per cent. of totals.	
1878	—	—	12,000	2·61	103,000	22·79	11,000	2·42	453,000
'88	—	—	38,000	3·11	94,000	7·65	46,000	3·75	1,228,000
'98	85,000	1·08	231,000	2·90	219,000	2·82	292,000	3·78	7,796,000
1908	160,000	0·80	314,000	1·56	1,603,000	7·98	718,000	3·57	20,104,000
'09	139,000	0·71	314,000	1·56	1,349,000	68·7	621,000	3·16	19,670,000

* *Financial and economic annuals*, No. 1, pp. 58 and 59; No. 9, pp. 110 and 111.

PART XI.—*Shipping subsidies.*

In the year 1896 the Shipbuilding Encouragement Law and the Navigation Encouragement Law were enacted for the purpose of extending the Mercantile Marine. Under these laws payments have been made or appropriated to the extent of nearly £8,000,000 during a period of thirteen years. As the table shows, these disbursements are increasing rapidly, the estimated amount for 1909 being equal to about £1,304,533.

TABLE 28.—*Shipping subsidies.*

	General bounty to vessels not on subsidised routes.	Subsidised routes.	Shipbuilding bounty.	Total.
	£	£	£	£
1897	72,255	54,947	1,337	128,539
'98	263,242	68,475	21,815	353,532
'99	403,646	91,483	19,154	514,283
1900	121,254	421,528	15,599	558,381
'01	92,433	544,064	59,271	695,768
'02	68,983	625,522	41,958	736,463
'03	81,848	619,947	44,656	746,451
'04	2,889	189,100	20,685	212,674*
'05	8,402	169,865	58,562	236,829*
'06	100,268	485,519	50,432	636,219
'07	98,101	715,640	69,059	882,830
'08	137,344	699,645	153,976	990,965
'09, Budget	409,267	767,474	127,792	1,304,533
	1,859,932	5,453,209	684,326	7,997,467

* The decline in these years due to the employment of vessels in the Russo-Japanese war.

This expenditure is principally in connection with cargo-carrying vessels, differing in this respect from the subsidies paid by Great Britain, which are chiefly for mail services. The comparative payments per ton of gross shipping under the respective flags of the principal nations are set forth in Table 29.

TABLE 29.—*Shipping subsidies paid by various nations.*

Flag.	Total gross tons.*	Subsidies.†			Average subsidy per gross ton.
		Mail service.	Sub-ventions, bounties.	Total.	
		£	£	£	£ *s.* *d.*
British	18,059,037	859,588	267,557	1,127,145	0 1 3
German	3959,318	372,970	67,500	440,470	0 2 3
American (excluding Great Lakes)	1,641,919	?	?	346,266	0 4 3
French	1,448,172	1,067,271	720,000	1,787,271	1 4 8
Japanese	1,146,977	?	?	1,305,000	1 2 9

* *Lloyd's Register for* 1910, p. 889.

† *The Shipping world year-book for* 1910, p. 273.

A table relating to the finances of the principal steamship companies appears on page 167 of the *Tenth financial and economic annual* for 1910, from which the following particulars have been extracted. It appears that nearly five-sixths of the Japanese subsidies are paid to four companies owning between them 557,172 tons gross, the amounts received in this form being equal to £1 19*s.* per gross ton—nearly double the amount of their net earnings, that is to say, about one-half of the subsidies is appropriated for losses incurred in carrying on the business.

TABLE 30.—*Statistics relating to the principal steamship companies* 1909.

Name of company.	Paid-up capital.	Reserves.	Number of vessels.	Gross tonnage.	Shipping subsidies.	Net carnings.	Dividend amount.
	£	£			£	£	£
Nippon Yusen	2,244,000	2,184,542	124	343,386	664,661	267,195	224,400
China Japan....	826,200	8,647	51	29,757	47,221	32,450	20,655
Toyo Kisen	828,750	21,692	11	60,793	210,179	25,468*	Nil.
Osaka Shosen	1,683,000	189,147	133	123,236	165,290	321,170	100,980
	5,581,950	2,404,028	319	557,172	1,087,351	595,347	346,035

* Loss.

These particulars afford an idea of the sacrifice required from the Japanese tax-payer for the maintenance of the Mercantile Marine. It may, of course, be argued that the subsidies and bounties should be charged to the Navy as the cost of creating an efficient means of transport for use in time of war. The larger vessels employed in the European and American lines are all constructed for use as armoured cruisers, and the subsidy contracts entitle the Government in time of need to pre-emption at certain monthly rates. These far-sighted stipulations reduce the cost of transport during the time of war to the most economical basis.

Such considerations do not, however, afford any consolation to shipowners exposed to these unequal terms of competition, and it is probable that Japan loses much goodwill through the wide-spread fear of similar semi-official encroachments on the legitimate sphere of commerce. The policy is, however, nearing its limits, for Japanese shipowners who do not benefit by the subsidies are beginning to realise that they too are sufferers, being subject to a competition sustained by the general taxation towards which they are compelled to contribute.

Part XII.—*Manufactures and commerce.*

Prior to the Restoration in 1868 manufactures and commerce were practically unknown. Men could not change their mode of livelihood without permission, whilst craftsmen were subject to many restrictions. With the fall of feudalism freedom of action and liberty of trade were allowed. For some years past it has been the ambition of the Japanese people to become a great manufacturing and trading nation, to win in this respect the title of "The Britain "of the East," and to secure the great populations of the Asiatic Continent as their chief customers.

The Government, faced with a rapidly-increasing population, have encouraged this ambition, and their people are now without doubt more advanced in an industrial sense than any other nation in the Orient. This has given rise to a feeling, both in Europe and America, that Japan, with her cheap and intelligent labour, is a dangerous competitor for the trade of the world, but a careful survey of general conditions reveals the fact that anxiety in this respect is not yet justified. The standard of living is continually rising, labour as it becomes more efficient becomes more costly,[26] and both these tendencies are accelerated by the rise of

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[26] The ultimate course of this tendency may be modified by climatic differences. The sunny winter and warm summer of Japan diminish the necessary outlays for shelter and clothing, for food and warmth and to that extent handicap the workers in less favoured climes.

Japan to the position of a great power, entailing costly armaments, large expenditure on new territories, and the inevitably increased scale of expenditure accompanying such an advancement.

Allusion has already been made to the dread of foreign complications, which has shaped Japan's foreign policy during the last three centuries. Conscious now of her military and naval strength, there is no longer any fear that her rights will suffer from lack of respect, but the old feudal spirit, having for its aim a self-contained independence, no matter what the cost, has reasserted its power in the sphere of commerce, and every possible measure is now tried which seems likely to assist in gaining a similar independence in the economic sense. Hence the policy of establishing certain industries under Government management; more than one fourth [27] of the male operatives employed in factories are in the direct employ of the Government. With the same object in view other enterprises receive subsidies or privileges upon which they rely for success, and others still demand and receive a large measure of tariff protection. An analysis of Table 33 shows what an amount of favour is bestowed upon a small section of the industrial community at the cost of the general body of taxpayers. The same motive is apparent in the assistance given to bankers and merchants for the furtherance of foreign trade.

While the nation was in its industrial and commercial infancy this policy carried out on a small scale may have been advisable as an example and an encouragement to private enterprise. Indeed Japanese experience, as seen in the case of agriculture, proves conclusively that State aid, when limited to the fostering and encouragement of self-help, may exercise a very beneficial influence. When it goes beyond that it interferes with the natural sequence of things, ignores the vital questions of profit and loss, and irritates both those who pay the cost and those who are unfairly discriminated against by the subsidy.

It is instructive here to quote the opinions expressed nearly thirty years ago by the master mind which organised the Bank of Japan, established the gold standard, and laid the foundations of that financial stability to which Japan owes so much of her progress.

Speaking on this very subject in 1882 Marquis Matsukata said: [28]

"The natural function of a Government is chiefly to protect "the public interests and afford peace to the community. The "Government should never attempt to compete with the people in

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[27] The number of men employed in Government factories is 95,061. The number of men employed in private factories is 248,751 (*Tenth financial and economic annual*, pp. 70 and 78).

[28] *Gold standard*, p. 54.

" pursuing lines of industry or commerce. It falls most naturally " to the sphere of governmental activities to look after matters " concerning education, armament or police service, while matters " concerning trade or industry which have for their aim the " making of money, naturally fall outside of governmental actions. " In fact in these matters the Government can never hope to " equal in shrewdness, foresight, and enterprise, men who are " actuated by the immediate motives of self-interest. It is " always best, therefore, for the Government not to take immediate " concern in trade and business, but to leave those matters to " be conducted and developed by individual efforts and enterprise."

These remarks from this distinguished authority were expressed at a date when Japan was, as the statistics show, taking the first steps towards a general reorganisation of national life, feudal influences being then at their lowest ebb. It is clear that the reversal of the policy of Marquis Matsukata is in its essence the reassertion of the feudal instinct, the triumph of the very policy which he deprecated.

Turning now to the available statistics relating to manuactures, there does not appear to be any complete census of production, but Table 31, collated from the *Financial and economic annuals*, affords some indication of the rise of a few of the chief industries, though Table 32 is a better index of the progress of manufacturing establishments. That progress is certainly evident, but the value of product [and of product per operative] are very far excelled in the United Kingdom. For instance, the total value of the product of the Japanese textile factories in 1907, was approximately (first four items of Table 31) £37,766,000 turned out by 355,000 operatives (Table 33), or £106 per head, while according to the recent United Kingdom census of production, 808,398 wage earners in the cotton and woollen industries alone produced goods to the value of £247,271,000,[29] or £306 per operative. The difference is very striking even after due consideration has been given in comparing these returns to the fact that the nature of the market available determines to some extent the value of the product, inasmuch as a wealthy nation will consume more expensive goods than a poor one, and many of the goods produced in Japanese mills are of the cheaper sort.

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[29] Census of production [Cd-4896].

TABLE 31.—*Value of chief manufactured goods.**

Goods.	1887.	1892.	1897.	1902.	1907.
	£	£	£	£	£
Cotton yarns	358,768	2,405,578	5,178,084	8,676,771	14,485,627
Textiles—					
Silk and silk and cotton mixtures	4,361,176	7,020,482	12,493,162	8,921,130	12,103,859
Cotton				5,728,784	10,566,205
Others				771,208	610,454
Paper	795,251	840,199	1,557,404	2,173,588	3,262,291
Leathers	—	—	—	230,038	914,833
Porcelain and earthenware	299,145	537,447	526,633	704,953	1,319,947
Matches	—	708,028	667,946	878,074	1,537,969
Straw plait	—	35,939	—	242,490	430,944
Lacquered ware	—	—	418,861	564,924	771,230
Matting	—	—	492,936	872,215	1,126,051
Saké (rice beer)	8,456,021	7,565,901	10,856,399	10,929,864	17,170,678
Soy (sauce)	1,552,977	1,627,759	2,078,222	3,100,666	4,782,078
	15,823,338	20,741,333	34,269,647	43,794,705	69,082,166

* *Financial and economic annuals.*

TABLE 32.—*Factories and operatives.**

Year.	Factories worked by motors.						Number of factories worked by motors.	Number of factories not worked by motors.
	Steam.	Gas.	Petroleum.	Waterwheel.				
				Turbines.	Peltons.	Japanese.		
	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.		
1894	32,858	—	—	—	—	2,429	2,409	3,576
'98	68,918	—	—	—	—	6,010	2,964	4,121
1903	87,922	1,568	807	—	—	9,511	3,741	4,533
'07	237,233	4,745	3,605	13,058	7,991	4,005	5,207	5,731
'08	268,404	7,673	4,958	31,733	18,086	3,860	5,617	5,773

*Number of operatives employed.**

Year.	Male.	Female.	Total.
1894	141,914	239,476	381,390
'98	177,632	234,573	412,205
1903	182,404	301,435	483,839
'07	257,356	385,936	643,292
'08	248,751	400,925	645,676

* *Financial and economic annuals.*

TABLE 33.—*Operatives classified according to employment* (1907).*

	Operatives.					Average daily wages.			
	Under 14 years of age.		Total of all ages.			Above 14 years of age.		Under 14 years of age.	
	Male.	Female.	Male.	Female.	Total.	Male.	Female.	Male.	Female.
						s. d.	*d.*	*d.*	*d.*
Raw silk	157	13,624	8,010	148,588	156,598	0 8	6¾	3¼	3
Spinning	765	6,195	17,842	68,273	86,115	—	—	—	—
Weaving	1,351	13,982	13,734	93,749	107,483	—	—	—	—
Knitting and braiding	109	439	1,267	3,204	4,471	—	—	—	—
Textile factories	2,382	34,240	40,853	313,814	354,667	—	—	—	—
Machine making	518	3	15,357	252	15,609	1 4	4½	5¼	—
Shipbuilding	546	4	27,379	147	27,526	1 6	7¼	7	4¾
Tool making	1,001	147	14,442	1,599	16,041	—	—	—	—
Founding	216	28	2,472	397	2,869	—	—	—	—
Machine and iron factories	2,281	182	59,650	2,395	62,045	—	—	—	—
Ceramic	1,669	201	18,767	3,779	22,546	—	—	—	—
Gas	—	—	662	19	681	1 4	5½	—	—
Paper	102	227	4,555	2,678	7,233	—	—	—	—
Dyeing	233	45	3,801	611	4,412	—	—	—	—
Leather	4	1	413	78	491	1 0	6¼	5	—
Explosives, matches, &c.	1,139	2,997	7,386	12,931	20,317	—	—	—	—
Artificial manures	2	—	2,266	223	2,489	1 0	5¾	4½	—
Medicines, chemicals, &c.	108	197	3,396	1,256	4,652	—	—	—	—
Miscellaneous	53	67	1,783	811	2,594	—	—	—	—
Chemical factories	3,310	3,735	43,029	22,386	65,415	—	—	—	—
Brewery	122	18	16,380	584	16,964	—	—	—	—
Sugar	4	—	1,193	183	1,376	1 0½	6	3¾	—
Tobacco	409	1,253	5,383	16,355	21,738	1 0¼	5	3¾	2¾
Tea	4	72	621	834	1,455	1 3	7¼	4¾	3¾
Grain—cleaning and milling	14	1	2,058	95	2,153	0 10¼	7½	4¼	—
Mineral waters	4	15	267	197	464	0 11¼	5½	5¾	4¼
Confections	64	60	751	255	1,006	0 10	5¼	3	1¾
Canning and bottling	22	56	409	412	821	0 10½	5	4	2¾
Miscellaneous	17	13	1,487	728	2,215	0 11	5½	4	3½
Food and drink factories	660	1,488	28,549	19,643	48,192	—	—	—	—
Printing and publishing	2,188	592	13,380	2,533	15,913	0 9¾	5½	3¼	3
Paper ware	487	600	2,502	1,921	4,423	0 10¼	5	3½	2¼
Wood and bamboo work	618	1,455	7,313	5,727	13,040	—	—	—	—
Leather ware	36	2	951	110	1,061	1 2	8	4½	3¾
Feather ware	34	156	1,081	1,407	2,488	1 1	5	4½	3½
Matting and straw braids	80	756	617	2,150	2,767	0 10	5½	2¾	2¾
Stone ware	220	25	612	137	749	1 2½	6	4	3¼
Lacquer ware	48	5	346	66	412	0 11½	7	4½	3½
Miscellaneous	633	587	5,827	6,291	12,118	—	—	—	—
Miscellaneous factories	4,344	4,178	32,629	20,342	52,971	—	—	—	—
Electrical industry	—	—	1,025	9	1,034	1 0½	7	—	—
Metal refineries	486	245	45,488	7,040	52,528	1 1	5½	4¼	2¾
Coal (briquettes)	63	3	6,133	307	6,440	1 2½	7½	6	4½
Special factories	549	248	52,646	7,356	60,002	—	—	—	—
Total	13,526	44,071	257,356	385,936	643,292	—	—	—	—

* *Financial and economic annual*, 1909, p. 66.

PART XIII.—*Imports and exports.*

As much attention is given by the Press to the value of imports and exports of all important countries, it may appear superfluous to refer to these, and yet no record would be complete without some particulars. Tables 34—37, in the appendix, have been drawn up in yearly averages for periods of ten years, commencing with 1869, and the figures for the single year 1909 have been added for comparison. By this method the differences due to special conditions in any single year are largely eliminated. The principal feature of Tables 34 and 35 is the excess of imports. Tables 36 and 37 indicate the direction of Japanese trade, and in view of the great competition which exists it is remarkable that Great Britain still retains, by a very large amount, the leading position as a supplier of goods from Europe. Table 38 is added to show the extent of Japanese trade with the British Empire. Table 39 illustrates progress of total trade year by year both in volume and *per capita.* It has suffered a check in the rate of increase during the last few years; whether there is any connection or not it may be noted that this check coincides with the application of a tariff, nearly as protective in its character as that of Germany, the average percentages levied in each country in 1908 being:—

Japan[30]	15·93 per cent.	of the value of dutiable imports.
Germany[31]	19·00 „	

The following comparison is given to confirm the view already expressed in Part I, namely:—That the progress of Japanese trade compared with our own is quite insufficient as a cause for alarm either at present or in the near future. In total volume the trade of the United Kingdom is still eighteen times greater, while the growth *per capita* within twenty years is £2 5*s.* 10*d.* compared with only £1 2*s.* 4*d.* in the case of Japan.

		Imports.	Exports, including re-exports.	Total.	Total *per capita.*
		£	£	£	£ *s.* *d.*
Japan*	1889	10,190,000	10,800,000	20,990,000	0 10 6
	1909	40,200,000	42,150,000	82,350,000	1 12 10
Increase		30,010,000	31,350,000	61,360,000	1 2 4
United Kingdom†	1889...	428,000,000	316,000,000	744,000,000	19 19 10
	1909....	625,000,000	469,000,000	1,094,000,000	22 5 8
Increase		197,000,000	153,000,000	350,000,000	2 5 10

* *Financial and economic annual*, 1910, p. 92.
† *Statistical abstracts*, No. 47 and No. 57.

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[30] *Annual returns*, 1909, p. 669.

[31] *Statesman's year-book*, 1910, p. 847.

TABLE 38.—*Japanese trade with the British Empire.*

	Exports.					
	Yearly average, 1889-1898.		Yearly average, 1899-1908.		1909.	
	£	Per cent of total exports.	£	Per cent. of total exports.	£	Per cent. of total exports.
Great Britain	824,000	6·2	1,725,000	5·5	2,764,000	6·6
India	347,000	2·9	939,000	2·9	1,471,000	3·5
Straits Settlements	—	—	410,000	1·3	577,000	1·3
Canada	194,000	1·5	330,000	1·0	393,000	0·9
Australia	134,000	1·0	373,000	1·2	593,000	1·4
Hongkong	2,002,000	15·6	2,950,000	9·3	2,211,000	5·2
Total British Empire	3,501,000	27·2	6,727,000	21·2	8,009,000	18·9

	Imports.					
	Yearly average, 1889-98.		Yearly average, 1899-1908.		1909.	
	£	Per cent. of total imports.	£	Per cent of total imports.	£	Per cent. of total imports.
Great Britain	4,639,000	30·8	7,975,000	21·9	8,795,000	21·9
India	1,756,000	11·9	5,833,000	16·1	6,646,000	16·5
Straits Settlements	—	—	177,000	0·5	303,000	0·8
Canada	6,000	—	67,000	0·2	111,000	0·2
Australia	70,000	0·5	348,000	0·9	343,000	0·9
Hongkong	997,000	6·5	404,000	1·1	64,000	0·1
Total British Empire	7,468,000	49·7	14,804,000	40·7	16,262,000	40·4

Hongkong was formerly a great port for transhipment. The diminished trade with Hongkong represents the decline in transhipment, due to the establishment of direct steamer lines between the various countries and Japan.

TABLE 39.—*Total exports and imports with duties thereon.**

Year.	Exports.		Imports.	
	Total value.	Per head.	Total value.	Per head.
	£	£ s. d.	£	£ s. d.
1878	4,876,000	0 2 10	6,168,000	0 3 7
'88	10,109,000	0 5 1	10,070,000	0 5 1
'98	16,907,000	0 7 9	28,305,000	0 12 11
1903	29,529,000	0 12 8	32,348,000	0 13 10
'04	32,564,000	0 13 9	37,879,000	0 16 1
'05	32,796,000	0 13 9	49,831,000	1 0 11
'06	43,223,000	0 17 11	42,716,000	0 17 9
'07	44,106,000	0 18 1	50,436,000	1 0 8
'08	38,581,000	0 15 7	44,498,000	0 17 11
'09	42,138,000	0 16 10	40,208,000	0 16 0

Year.	Dutiable imports.	Duties collected.	Percentage of duty.	Total of exports and imports.	
				Total value.	Per head.
	£	£		£	£ s. d.
1878	5,989,000	276.000	4·61	11,044,000	0 6 5
'88	9,724,000	419,000	4·31	20,179,000	0 10 2
'98	16,883,000	641,000	3·79	45,212,000	1 0 8
1903	17,192,000	1,670,000	9·71	61,877,000	1 6 6
'04	21,262,000	2,093,000	9·84	70,443,000	1 9 10
'05	30,015,000	3,498,000	11·66	82,627,000	1 14 8
'06	28,696,000	4,205,000	14·66	85,939,000	1 15 8
'07	31,351,000	4,790,000	15·28	94,542,000	1 18 9
'08	28,703,000	4,571,000	15·93	83,079,000	1 13 6
'09	22,615,000	3,615,000	15·98	82,316,000	1 12 10

Exports.—The values represent the price at the port of shipment.

Imports.—The values prior to 1899 represent the original price in the country of origin, and in that and subsequent years the cost, insurance and freight.

* *Financial and economic annual*, 1910, p. 92 ; *Annual returns of foreign trade*, 1909, p. 669.

PART XIV.—*Banking.*

In the year 1882 the then Minister of Finance, Marquis Matsukata, presented a Memorandum to the Cabinet on the subject of banks, especially urging the establishment of a central bank as essential to the maintenance of a sound monetary system. Time has shown that the ideas embodied in this memorandum have served as a basis for the present Japanese banking system, and a few extracts will assist in explaining the function and object of the financial organisations with which the Government is more or less officially connected.

" In national affairs, there is nothing of greater importance than " a financial policy. The prosperity of the nation, the happiness of " the people, the awakening of industrial enterprises and the

" activity of commercial transactions, all are closely bound up with " a sound financial policy. As a good physician looks not after every " evil that is apparent, but after the evil that lies at the root of all " and tries to bring about the healing of all by healing the one " fundamental evil, so a good financier should aim not at every petty " policy of temporary makeshift, but at some fundamental policy " through which at one stroke financial soundness and health may " be infused into the body politic. It seems to me the establishment " of a *Central Bank* is just such a policy. . . . . *The* " *Industrial Banks* have for their object the loaning of capital on " the security of land, houses and other real estate, for agricultural " purposes or for manufacturing enterprises, like silk manufacture " for example, or for engineering objects like a canal construction or " harbour works. . . . . Industry and thrift are two chief " factors in the production of national wealth, and the *Savings* " *Banks* have for their aim the encouragement of the spirit of " thrift. . . . . These three kinds of banks therefore while " their organisations are distinct and different so that they may " never be brought within one organisation, are yet closely dependent " upon each other, and by mutual support work together toward the " increase of national prosperity. They may be compared to the three " feet of a tripod which support the economic structure of a nation."

Omitting any reference to the Central Bank, which is *sui generis*, it may be said that the policy dictating the establishment of the large group of semi-official banks (Table 40), the origin of which has just been mentioned, is based on the theory that a low rate of interest is as essential to economic welfare as plentiful supplies of labour and material. These banks, therefore, were intended to be reservoirs of capital available on the lowest terms consistent with absolute safety and moderate dividends. The really important point to a progressive community is, however, not so much the existence of a low rate of interest as an ample supply of capital. It does not follow that the semi-official banks, though reducing the rate of interest, have greatly increased the amount of capital at the disposal of the special interests which it was desired to foster. Being under strict control such institutions can only grant advances where security for both principal and interest is unquestionable. By reason of their privileges they absorb all such first-class business, but anything of an inferior nature they must leave alone. Obviously, the private capitalist, being unable to secure a sufficient share of the safest and best risks with a sufficient margin of profit wherewith to build up the average returns, must charge greatly higher rates for the inferior risks left to him, or employ his money in other directions. The conclusion that capital provided under Government auspices has only displaced private capital seems justified by prevailing conditions, so far as they can be noted. On the one hand, there is a pressing need for money in connection with agriculture, the provision of labour-saving appliances, better means of transport, &c. On the other hand, there is a large array of banks so plentifully stocked with funds that on several occasions within the last year or two interest on short loans has ruled lower in Japan than in London.[32] Stated in another way, the reservoirs of cheap capital provided by Government action appear to have diverted part of the normal flow of money into channels which prove beneficial to a few, but to that extent deprive the country at large of its more fruitful use.

The progress of all banking institutions during forty years is summarised in Table 41. To this are added certain comparative figures for the United Kingdom. Having regard to the differences in economic wealth and activity, the amount of banking capital employed in Japan is much larger than in our country. In banking profits the excess is still more remarkable. Whether the standard taken be the volume of production or the extent of trade, the amount of individual wealth or the expenditure of public bodies, it seems apparent that the proportion of banking profits is 8 or 10 times larger than in the United Kingdom, and that an unduly large share of the income of the nation is absorbed in this manner; in other words, that the mechanism of banking is extravagant in its cost to the people, a tax on the fruits of their labour.

The extraordinary increase in deposits within the last decade (see Table 41) is attributable to the loans issued in Europe during the recent war with Russia. A considerable portion of the funds so obtained was spent in Japan, so that there has been a large transfer of capital from Europe. Such an accession of capital, if distributed through the country in fructifying use, ought to accelerate internal development. At present, however, much of it appears to be concentrated on purposes which really belong to a more highly organised state of production and industry. For instance, investments in Government bonds and company debentures, and facilities to traders, which are displacing the foreign capital hitherto used in financing the import and export trades.

[32] Comparative table of bank rates and discount:—

1910.	In Japan (*Japan Chronicle*).		In London (*The Times*).	
	Discount rate.	Call money.	Bank rate.	Call money.
	Per cent.	Per cent.	Per cent.	Per cent.
October 25	3·29	2·92	5	4
November 22	3·65	2·92	5	4

TABLE 40.—*Principal particulars. All Japanese banks,* 1908.*

	First established in	Paid-up capital.	Reserve.	Deposits.	Loans and discounts.
		£	£	£	£
Bank of Japan†	1882	3,060,000	2,397,000	22,469,270	10,966,500
Yokohama Specie Bank†	'80	2,448,000	1,580,075	11,917,669	8,526,924
Agricultural and Industrial banks†	'96	2,958,466	566,622	882,977	3,719,172
Hypothec Bank of Japan†	'96	510,000	174,701	—	4,667,766
Bank of Formosa†	'99	510,000	116,280	1,141,252	1,823,098
Hokkaido Colonial Bank†	1900	357,000	53,091	480,966	1,101,695
Industrial Bank of Japan†	'02	1,657,500	101,286	1,027,412	2,749,022
		11,500,966	4,989,055	37,919,546	33,554,177
Ordinary banks	1887	30,146,016	9,561,881	95,673,229	110,721,526
Savings banks	'93	5,153,402	1,338,919	21,927,378	14,882,624
		46,800,384	15,889,855	155,520,153	159,158,327

* *Financial and economic annual,* 1910, pp. 124—129.

† These banks may all be described as semi-official institutions, being more or less subject to Government control.

TABLE 41.—*Synopsis table, showing principal items of progress, all banks.**

	1873.	1888.	1898.	1908.
	£	£	£	£
Issued capital	666,666	—	38,902,702	62,573,777
Paid-up capital	666,666	11,871,984	26,172,590	46,800,384
Reserve funds	—	1,930,397	4,249,269	15,889,855
Deposits	2,140,251	15,464,862	40,671,786	155,520,153
Loans and discounts	603,408	19,940,370	41,334,833	159,158,327
Net profit	not available		4,122,411	7,994,290
Dividends declared			2,178,936	3,736,230

* *Financial and economic annuals,* 1903, pp. 102—111; 1906, pp. 138 and 139; 1910, pp. 124 and 125.

The comparative figures for the United Kingdom and Japan for the year 1908 are:—

	All banks. Japan, 1908.*	Joint stock banks, United Kingdom, 1908.†
	£	£
Paid-up capital	46,800,384	79,917,000
Reserve funds	15,889,855	52,185,000
Deposits and current accounts	155,520,153	930,000,000
Loans and discounts	159,158,327	599,000,000
Net profit	7,994,290	10,200,000‡
Value of imports and exports (1909)	82,346,000	1,094,000,000
Coal production (1908) tons	14,825,000	261,500,000
Income tax levied on (1908)	78,826,000§	693,323,000‖
Local expenditure (1908)	21,133,000	164,700,000

* *Financial and economic annual*, 1910.

† The *Economist*, May 22, 1909.

‡ Calculated as follows: 46 banks disclosed profits of £7,743,491 on a paid-up capital of £60,779,930 = 12·74 per cent. At the same rate, the profits on the total paid-up capital of all joint stock banks in the United Kingdom, £79,916,871, would equal £10,181,409. Some additions should be made to this last figure for the profits of the few remaining private banks, but the omission does not vitiate the comparison to any serious extent.

§ Leviable on incomes over £30.

‖ ,, £160.

PART XV.—*Currency.*

When the Central Government assumed power in 1868, the currency of the country was in a state of the greatest disorder. There was a great variety in the kinds of coin, some of them limited in circulation to certain restricted districts; there was no legal standard of weight, fineness, quality, or size, and numerous counterfeits were in existence. There were also over 1,600 varieties of paper money issued by the various principalities.

Within a space of less than thirty years, that is to say, before 1898, modern Japan accomplished not only the reform of this complicated currency and the establishment of a decimal system of coinage, but in the interim passed through the fires of experience in connection with bimetallic, paper, and silver currencies, finding them to be wanting in every respect. There have been critics who in recent years expressed a fear that Japan might, in case of great need, abandon the gold standard, but few people understand and realise as well as do the Japanese how absolutely all financial stability depends upon its preservation.

The proportion of specie reserve at different dates is given in Table 42, and in this connection it is interesting to note that in the thirty-eight years since 1872, when records of gold and silver movements were first commenced, the total imports and exports have been as follows :—

	Gold bullion and specie.	Silver bullion and specie.	Total gold and silver bullion and specie.*
	Yen.	Yen.	Yen.
Imports	384,170,987	276,603,969	660,774,956
Exports	396,812,426	252,673,318	649 485,744
Excess of imports	—	23,930,651	—
" exports	12,641,439	—	—
Net excess imports	—	—	11,289,212

* *Financial and economic annuals*, 1906, 1910.

The gold reserve held by the Bank of Japan at the end of December, 1909, amounted to yen 217,548,000, or slightly over £22,000,000. This accumulation of gold at the end of a period when there was a slight excess of exports, requires some explanation. There has always been a small production of gold from alluvial washings and from quartz crushing, the mines being situated in many parts of the country and none of them very rich. The Dutch trade in the sixteenth and seventeenth centuries consisted mainly in the purchase of gold, silver and copper and the records say that between 1596 and 1638 gold to the value of £9,500,000 was exported in this way.[33] The official statistics of production in recent years are :—[34]

	£		£
1899	= 226,002	1905	= 414,509
1900	= 288,875	'06	= 370,639
'01	= 336,678	'07	= 399,539
'02	= 404,694	'08	= 489,315
'03	= 426,282		
'04	= 375,430		3,731,963

But there is no doubt that a still larger quantity is never declared to the officials of the Mining Bureau and yet finds its way to the Bank of Japan. Gold washings are also found in Formosa, while there are several gold-bearing areas of some importance in Korea. From both these places the precious metal is probably taken to Japan without any official cognisance.

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[33] Brinkley's *Japan*, vol. 3, p. 149.

[34] *Tenth financial and economic annual*, p. 62.

TABLE 42.—*Amount of reserve against note issue.**

Year.	Convertible notes issued.	Gold coin and bullion.	Silver coin and bullion.	Public loan bonds.	Other securities.	Total reserve.	Percentage of specie reserve.
	£	£	£	£	£	£	Per cent.
1897....	23,075,364	9,885,154	137,517	3,376,887	9,675,806	23,075,364	43·43
'98 ...	20,134,790	9,136,164	—	3,199,157	7,799,469	20,134,790	45·37
'99....	25,557,328	10,520,501	714,000	2,428,293	11,894,534	25,557,328	43·96
1900....	23,314,143	6,665,610	204,000	2,929,095	13,515,438	23,314,143	29·47
'01....	21,837,870	7,023,554	255,000	3,599,586	10,959,730	21,837,870	33·33
'02....	23,673,627	11,028,120	102,000	3,941,097	8,602,410	23,673,627	47·01
'03....	23,757,897	11,930,142	—	3,918,980	7,908,775	23,757,897	50·22
'04....	29,235,827	8,150,282	375,003	2,731,490	17,979,052	29,235,827	29·16
'05....	31,904,664	11,790,693	—	4,344,107	15,769,864	31,904,664	36·95
'06....	34,860,149	15,014,617	—	7,655,773	12,189,759	34,860,149	43·07
'07 ..	37,738,379	16,497,697	—	7,144,413	14,096,269	37,738,379	43·72
'08 ...	35,978,896	17,289,460	—	6,001,400	12,688,036	35,978,896	48·05
'09....	35,981,846	22,220,014	—	3,243,875	10,517,957	35,981,846	61·75

* *Financial and economic annuals*, 1904, pp. 114 and 115; 1910, p. 138.

Japanese economists sometimes attribute the appreciation of prices in recent years to the increased volume of money now in circulation. Expressed in yen, the figures were in 1872 yen 3·25 per head and in 1908 yen 10·22, but when converted into gold at the rates ruling in the respective years the apparent difference is not nearly so great, the sterling equivalents being (Table 43) 13*s.* 5*d.* in 1872 and £1 0*s.* 10*d.* in 1908. According to Mulhall, the figure for the United Kingdom in 1896 was £4 5*s.* per head of population.

TABLE 43.—*Currency in circulation per head of population.**

Year.	Population.	Coinage.		Notes.		Total currency.	
		Amount.	Per head.	Amount.	Per head.	Amount.	Per head.
		£	*s.* *d.*	£	*s.* *d.*	£	£ *s.* *d.*
1872	33,110,793	8,189,040	4 10	14,250,000	8 7	22,439,040	0 13 5
'78	35,000,000†	10,562,340	6 0	31,087,730	17 10	41,650,070	1 3 10
'88	39,607,234	10,407,791	5 2	21,566,919	10 10	31,974,710	0 16 0
'98	43,763,855	8,256,034	3 9	20,877,175	9 6	29,133,209	0 13 3
1908	49,587,243	15,367,878	6 3	35,978,896	14 7	51,346,774	1 0 10

* *Financial and economic annuals*, 1903, pp. 118 and 119; 1910, pp. 136 and 137.

† Approximate.

PART XVI.—*Local revenue and expenditure.*

The practical absence of local expenditure in the early years of the present era is illustrated in Table 44. After the lapse of twenty-five years, that is in 1893-94, the expenditure of all prefectures, cities and villages only amounted to about £6,500,000. Since then, however, the cost of education and the necessity for public works have resulted in much increase of expenditure, so that for the last financial year it amounts to a little over £21,000,000. The corresponding expenditure in the United Kingdom in 1907 was £164,716,983.[35]

The local loans outstanding in 1909 were £16,619,000 compared with over £584,000,000 in the case of the United Kingdom.

It may here be remarked that in Japan there is practically no poor law expenditure, the amount paid by the State in this respect in 1906 being about £30,000 compared with £17,000,000 in the United Kingdom; less than a half-penny in Japan against each sovereign disbursed in this country.

TABLE 44.—*Revenue and expenditure of municipal corporations.**

Financial year.	Revenues of prefectures.		Revenues of cities.		Revenues of towns and villages.		Grand totals. Revenue.	Grand totals. Expenditure.
	Rates.	Other sources.	Rates.	Other sources.	Rates.	Other sources.		
	1,000 £.	1,000 £.	1,000 £.	1,000 £.	1,000 £.	1,000 £.	£	£
1889	2,389	1,254	—	—	—	—	3,643,000	3,312,000
'93	2,089	1,888	203	1,048	1,868	1,144	8,240,000	6,432,000
'98	3,211	1,649	474	1,088	2,972	1,790	11,184,000	9,837,000
1903	4,597	2,103	1,237	2,148	4,934	2,854	17,873,000	16,090,000
'08	5,074	1,436	1,691	5,586	6,283	2,568	22,638,000	21,133,000

For the twelve months commencing on April 1 in the year specified.

Note.—The difference between revenue and expenditure shown in each period is due to balances carried over from one year to the next.

* *Financial and economic annuals*, 1902, pp. 26 and 27; 1909, pp. 40 and 41.

TABLE 45.—*Outstanding local loans.**

	1898.	1903.	1908.	1909.
	£	£	£	£
Loans of prefectures	804,290	1,235,764	1,519,826	1,551,569
,, of rural districts	4,665	90,989	161,395	150,196
,, of cities	1,173,151	4,241,189	7,055,519	13,260,020
,, of towns and villages	39,106	1,020,743	1,028,964	1,247,545
,, of local associations	45,765	256,716	416,307	409,913
,, not stated	328,391	—	—	—
Totals...........	2,395,368	6,845,401	10,182,011	16,619,243

* *Financial and economic annual*, 1910, pp. 44—47.

PART XVII.—*National revenue and expenditure.*

The national revenue at different periods is set forth in Table 46, and the national expenditure in Tables 47 and 48. In Table 47

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[35] *Statistical abstract*, No. 57, p. 55.

TABLE 46.—*National Revenue.**

Sources of revenue.	1873.	1897.†	1907.†	1908.†
Ordinary.	£	£	£	£
Land tax	12,626,000	3,872,000	8,667,000	8,713,000
Income tax	—	214,000	2,784,000	3,279,000
Business tax	—	450,000	2,079,000	2,405,000
Tax on liquors	200,000	3,179,000	7,997,000	8,526,000
,, soy	—	156,000	558,000	496,000
Sugar excise	—	—	1,650,000	2,008,000
Consumption tax on textile fabrics	—	—	1,950,000	1,970,000
Tax on dealers in patent medicines	—	—	22,000	23,000
Mining tax	—	43,000	222,000	204,000
Tax on stock exchanges	—	113,000	322,000	246,000
,, the issue of bank notes	—	57,000	340,000	181,000
Tonnage dues	—	—	62,000	59,000
Customs duties	351,000	818,000	5,103,000	4,087,000
Travelling tax	—	—	283,000	291,000
Succession tax	—	—	186,000	249,000
Consumption tax on kerosene oil	—	—	5,000	172,000
Other taxes	268,000	655,000	—	—
Stamp receipts	74,000	733,000	2,566,000	2,331,000
Total taxes and stamp receipts	13,519,000	10,290,000	34,796,000	35,240,000
Postal and telegraph services	—	1,245,000	3,798,000	3,994,000
Forests	—	161,000	839,000	969,000
Profits of salt monopoly	—	—	2,515,000	1,592,000
,, camphor monopoly	—	—	92,000	23,000
,, tobacco monopoly	—	30,000	3,632,000	5,029,000
Railway profits	—	465,000	3,288,000	3,581,000
Other receipts from public undertakings and State property	—	87,000	297,000	281,000
Total receipts from public undertakings and State property	495,000	1,938,000	14,461,000	15,469,000
Other miscellaneous receipts	686,000	393,000	956,000	1,297,000
Total ordinary	14,700,000	12,671,000	50,213,000	52,006,000
Extraordinary.				
Proceeds of sale of State property	—	94,000	250,000	281,000
Local contributions to special expenses	—	40,000	248,000	110,000
Receipts from the issue of public loans	2,257,000	3,712,000	—	84,000
Chinese indemnity	—	4,117,000	207,000	207,000
Forestry fund transferred	—	—	224,000	251,000
Transferred from warships and torpedo boats replenishing fund	—	—	1,116,000	1,116,000
Temporary loans	—	—	102,000	168,000
Surplus of the preceding year transferred	—	1,853,000	28,429,000	25,978,000
Other miscellaneous receipts	857,000	605,000	6,633,000	883,000
Total extraordinary	3,114,000	10,421,000	37,209,000	29,078,000
Total revenue	17,814,000	23,092,000	87,422,000	81,084,000

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* *Financial and economic annuals*, 1903, pp. 10, 11, 18, 19, and 1910, pp. 14, 15.

† For the twelve months commencing April 1 in the year specified.

the principal items of expenditure are compared with the nearest corresponding items in the British budget. Among other matters attention may be drawn to the proportionately large amount required for the national debt, due to the higher rate of interest and the operations of the sinking fund. Considering the lower cost of living in Japan, the nominal rates of pay, and the smaller extent of external responsibilities, the army expenditure seems disproportionately high. In Table 48 the total national and local expenditure is stated "per family" first in yen and then in the equivalent sterling.

TABLE 47.—*National Expenditure. Year ending March* 31, 1909.

Japan.*		United Kingdom.†	
Branches of expenditure.	£	Branches of expenditure.	£
Imperial household	306,000	Civil list	470,000
Foreign affairs	925,340	Diplomatic and consular services	531,767
		Colonial services, &c.	1,292,477
National debt	18,037,632	National debt	28,000,000
Army	14,464,129	Army services and Ordnance factories	26,840,000
Navy	7,301,002	Navy services	32,188,000
Justice	1,191,454	Courts of law and justice	4,481,502
Public instruction	780,306	Education, science and art	17,368,771
Communications	5,014,489	Post office	18,113,000
Home affairs	2,925,972	Salaries and expenses of civil departments	2,874,343
Agriculture and commerce	2,164,864		
Rewards and pensions	2,808,632	Non-effective and charitable services	2,848,113
Expenses of collecting inland taxes	679,781	Expenses of collecting Customs and Inland Revenue	3,320,000
Transfer of railway revenues to separate account	3,332,230	Payments to local taxation	9,824,285
Other expenditure (Finance department)	4,977,000	Other expenditure	4,140,136
Total expenditure	64,908,831	Total expenditure	152,292,394

* *Financial and economic annual*, 1910, p. 29.

† *Finance account*, 1908-09 (200).

TABLE 48.—*National and local expenditure per family.*

(Average of 5·36 persons per family, see Table 4.)

Branches of expenditure.	1873.	1897.*	1907.*	1908.*
	Yen.	Yen.	Yen.	Yen.
Finance department including interest on National Debt and redemption	7·77	6·11	29·00	31·62
Army	1·40	7·45	13·83	15·33
Navy	0·32	6·27	7·93	7·72
Justice	0·11	0·48	1·29	1·29
Education	0·21	0·32	0·75	0·80
Agriculture and commerce	—	0·38	1·82	2·31
Communications	0·11	2·73	7·88	5·31
Home affairs	—	3·43	2·30	3·11
Others	0·21	0·59	1·29	1·29
Total national expenditure	10·13	27·76	66·09	68·78
Total local expenditure	—	10·99	21·87	22·39
Total national and local expenditure per family	—	38·75	87·96	91·17
Population	33,111,000	43,229,000	48,816,000	49,587,000

Branches of expenditure.	1873.			1897.*			1907.*			1908.*		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Finance department including interest on National Debt and redemption	1	12	5	0	12	6	2	19	3	3	4	7
Army	0	5	10	0	15	2	1	8	3	1	11	4
Navy	0	1	4	0	12	10	0	16	2	0	15	9
Justice	0	0	5	0	1	0	0	2	8	0	2	7
Education	0	0	11	0	0	8	0	1	6	0	1	7
Agriculture and commerce		—		0	0	9	0	3	8	0	4	9
Communications	0	0	5	0	5	7	0	16	1	0	10	10
Home affairs		—		0	7	0	0	4	8	0	6	4
Others	0	0	10	0	1	2	0	2	8	0	2	8
Total national expenditure	2	2	2	2	16	8	6	14	11	7	0	5
Total local expenditure		—		1	2	5	2	4	8	2	5	8
Total national and local expenditure per family		—		3	19	1	8	19	7	9	6	1
Population	33,111,000			43,229,000			48,816,000			49,587,000		

* For the twelve months commencing on April 1 in the year specified.

PART XVIII.—*Taxation.*

Taxation in 1907 compares with 1873 as follows:—

	1873.	1907.
	Yen per family.	Yen per family.
National taxes and stamp receipts	10·50	37·47
Local taxes	—	13 83
	10·50	51·30
Profits of monopolies	—	10·91
	yen 10·50	yen 62·21

Two corrections must be kept in mind when considering this apparently great increase in taxation.

First, the difference in prices expressed in yen, due to the depreciation of silver and the general rise of values to the level of the international standard—a rise affecting wages as well as commodities, and to which reference has been made in Part III. Unfortunately, there are no statistics available as to wages and prices earlier than 1887 (see Table 8), but taking all into account it seems reasonable to estimate a four-fold increase between 1873 and 1907.

Secondly, the increased opportunities for a greater individual production, and for marketing that production, both in the home markets and in foreign countries. For instance, the import of kerosene oil from America has lengthened the available day of the humblest country home by one-fourth; the import of cotton and woollen goods from abroad has set free the hours formerly spent by peasant women in weaving, and given time for the minor home industries, such as embroidery, straw plaits, &c., which now bring to Japan a yearly increasing income from abroad. The advent of the railway has opened up districts formerly isolated by the cost of transportation. It is impossible to measure these factors, but they must lighten the real incidence of the higher amount collected in taxation, and it seems probable that the present percentage, though greater in the number of yen, is really less in the number of days' work per annum which it represents than was the case with the amount collected forty years ago.

It will now be interesting to ascertain as far as possible the proportion which present taxation bears to individual or family incomes.

In the absence of sufficient data it is difficult to form an estimate of the total income of the people, but there are several approximate indications.

A. Full particulars respecting income-tax are specified in

Table 51. The income of 1907 would pay tax in 1908, and in that year 1,124,594 individuals and 10,737 juridical (corporate) persons paid taxes upon an income of £78,826,000. Including the profits of the juridical (corporate) persons with that of the individuals and assuming that each individual represents a family, the average income of 1,124,594 income tax paying families would be £70 per annum.

B. The Department of Agriculture and Commerce states the total annual value of all the principal agricultural products (years 1905-07) as £126,000,000 (see Table 12). The same authority estimates that 4,600,000 families are entirely engaged in agriculture, therefore the value of the products is equal to £27 8*s.* per family. Some deduction must be made from this sum for costs of transport, profits of middlemen and purchase of imported fertilizers. Taking an arbitrary figure, say about 10 per cent. for this deduction, the net income of 4,600,000 farming families may be estimated to average about £24 10*s.* per annum.

C. There is no basis upon which to form an estimate respecting the remaining 40 per cent. of the population. As they do not figure in the tax returns their income must be less than £30 12*s.* (yen 300) per annum, the great number of fishermen certainly do not fare better than farmers, and if it be assumed that the whole group average the same income as the farming classes, it will probably be very near the truth. The result for the whole country may then be stated in round figures.

		Average.		
		£	*s.*	*d.*
Class A.	1,125,000 families paying income tax	70	0	0
Class B.	8,025,000 families not paying income tax................	24	10	0
	9,150,000 (estimated number of families in 1907)	£30	0	0

On this basis the proportion of taxation to average income works out as follows :—

	1907.			Per cent. of average income.	1908.			Per cent. of average income.
	£	*s.*	*d.*		£	*s.*	*d.*	
National taxes and stamp receipts	3	16	6	12·75	3	16	3	12·70
Local taxes	1	8	3	4·71	1	8	3	4·71
Profits of monopolies	1	2	3	3·71	1	6	6	4·42
	6	7	0	21·17	6	11	0	21·83

say 22 per cent.

In considering whether the burden of this taxation is excessive two questions arise. Does it leave any margin for saving ? How does the rate compare with that to which the people have been accustomed in former times?

The first question is best answered by the fact that in 1909 there were nearly 9,000,000 depositors in the Post Office Savings Bank, with deposits aggregating £10,860,000 (see Table 50), an amount increased in 1910 to nearly £13,000,000; in addition there were deposits remaining in the ordinary savings banks on June 30, 1909, to the extent of £23,675,000. Still other small savings have been invested in Government bonds, hypothec bank debentures, premium bearing bonds, all of which have been issued, as to a certain proportion, in small denominations and in bearer bonds ranging as low as yen 10, 20, 25 and 50 (say £1 to £5) for the special purpose of encouraging thrift and attracting the small investor.

In answer to the second question it has already been stated that the present taxation is probably less than in feudal times. In the twelfth century as much as 70 per cent. of the produce was taken by the tax collector. In the thirteenth century this was reduced to 50 per cent. and later to 40 per cent. In the sixteenth century it was again raised to 70 per cent. During the Tokugawa *régime*, from the close of the sixteenth century until the abolition of feudalism in 1867, the average rate of taxation was certainly not less than 40 per cent. of the gross produce.[36] The best indication, however, of the extent to which the Japanese people have accepted very high taxation as a normal condition of life, is the basis upon which the land tax was assessed in the year 1873, when the feudal tenants were recognised as owners of the land. The money value of the crops was capitalised on a basis of about 6 per cent. per annum, the annual tax, being fixed at 3 per cent. of the capital sum,[37] was equal to about 50 per cent. of the value of the crops.

Judging from these precedents, the present burden of taxation proportionate to production, is actually lower than the lowest rate prevailing in any previous era during the last eight hundred years,[38] and in partial support of this deduction there is the rapid increase of population mentioned in Table 2. Such comparisons must not be understood as suggesting that taxation may easily be advanced much beyond present rates. There is one great difference between

[36] Brinkley's *Japan*, vol. 12, p. 126.

[37] *Japan by the Japanese*, p. 346.

[38] There was an interval during the present reign, say the last ten or fifteen years of the nineteenth century, when prices of produce and wages appreciated considerably without a corresponding increase in the rate of taxation. Writers on Japan are sometimes misled by the exceptional circumstances of that period, and are apt to describe the present taxation as much heavier than any ever imposed, a statement which, in face of history, is manifestly incorrect.

the previous and present day conditions: namely, the multiplication of personal wants following in the wake of modern education and a generally wider outlook. The satisfaction of these wants comes to be regarded in many cases as an absolute necessity and must naturally decrease the sums which the people are willing to hand over to the tax gatherer.

TABLE 49.—*National and local taxation per family.*

(Average of 5·36 persons per family. See Table 4.)

	National taxes and stamp receipts.				Local taxes. Prefectures, cities and villages.				Profits from railways, &c.*				Total.			
	Yen.	£	*s.*	*d.*	Yen.	£	*s.*	*d.*	Yen.	£	*s.*	*d.*	Yen.	£	*s.*	*d.*
1873	10·51	2	3	9	—	—			—	—			10·51	2	3	9
'97	12·49	1	5	6	6·59	0	13	5	1·15	0	2	4	20·23	2	1	3
1907	37·47	3	16	6	13·83	1	8	3	10·91	1	2	3	62·21	6	7	0
'08	37·36	3	16	3	13·83	1	8	3	12·99	1	6	6	64·18	6	11	0

*	1897.	1907.	1908.
	Yen.	Yen.	Yen.
Profits on salt monopoly	—	12,164,000	15,606,000
„ camphor „	—	38,000	222,000
„ tobacco „	292,000	35,608,000	49,305,000
Railway profits	4,559,000	32,239,000	35,113,000
Net receipts, posts, telegraphs, &c.†	2,892,000	14,045,000	14,475,000
„ forests†	1,577,000	5,275,000	5,439,000
	9,320,000 = 1·15 per family	99,369,000 = 10·91 per family	120,160,000 = 12·99 per family

† Ordinary budget.

TABLE 50.—*Postal savings.**

	1898.					1909.				
	Number of depositors.	Amount.	Average per capita.			Number of depositors.	Amount.	Average per capita.		
		£	£	*s.*	*d.*		£	£	*s.*	*d.*
Agriculturists........	485,010	858,606	1	15	4	2,619,291	3,101,840	1	3	8
Artisans	91,212	223,305	2	9	0	495,830	813,528	1	12	10
Shopkeepers	204,702	546,526	2	13	4	928,794	1,933,242	2	1	8
Operatives	58,296	120,390	2	1	4	581,680	695,520	1	3	11
Fishers and sailors	14,906	31,296	2	1	10	148,432	217,506	1	9	4
Civil and military	74,248	172,999	2	6	0	574,731	1,003,868	1	14	11
Students	68,312	37,019	0	10	11	2,254,237	967,657	0	8	7
Others	256,952	636,793	2	9	7	1,058,412	2,125,810	2	0	2
Total	1,253,638	2,626,934	2	1	11	8,661,407	10,858,971	1	5	1

* *Financial and economic annuals*, 1908, pp. 160 and 161; 1910, pp. 146 and 147.

In 1908 the corresponding figures for the United Kingdom were 11,018,251 depositors, average £14 11*s.* 7*d.* each. Total deposits £160,648,214.

TABLE 51.—*Income tax.**

Class.†	Rate of tax.	1906.‡			1908.‡		
		Number of Tax-payers.	Income taxed.	Amount of tax.	Number of Taxpayers.	Income taxed.	Amount of tax.
	Per cent.		1,000 £'s.	1,000 £'s		1,000 £'s	1,000 £'s
Juridical (corporate) persons	6·25§	9,073	14,224	962	10,737	13,533	910
Personal incomes—							
Over £10,000....	20·35	21	236	48	32	284	58
,, £5,000....	17·00	77	360	61	96	425	72
,, £3,000....	13·95	182	426	59	301	671	94
,, £2,000....	11·60	299	471	55	471	714	83
,, £1,500....	9·45	512	574	54	727	760	72
,, £1,000....	7·50	1,516	1,134	85	2,271	1,648	124
,, £500....	6·00	7,180	3,045	183	10,095	4,244	255
,, £300....	4·60	13,931	3,536	163	19,912	4,998	220
,, £200....	3·91	22,037	3,706	145	30,590	5,094	199
,, £100....	3·45	83,783	8,150	281	117,529	11,350	390
,, £50....	2·52	235,649	12,014	303	330,773	16,643	419
,, £30....	2·00	462,329	13,902	278	611,797	18,462	369
Total ‖	—	836,589	61,778	2,677	1,135,331	78,826	3,265

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* Translated from the *Japanese Finance Department annual* for each year.

† Personal incomes are classified on "total income," including that derived from juridical (corporate) persons and Government bonds.

‡ For the twelve months commencing April 1 in the year specified.

§ The above rate is charged on joint stock companies organised with at least 21 shareholders. Other juridical (corporate) persons pay on a different scale.

The income-tax on interest arising from public loan bonds or companies' debentures is only 2 per cent.

‖ It is very probable that these figures are under the mark, because the Government have found it impossible to collect income-tax from city dwellers on many of the smaller incomes of, say, £30 to £50, The tacit, but unavoidable, acquiescence in this breach of the law leads to tacitly accepted evasions in the other classifications. There are no means of forming an opinion as to the extent of income which escapes record in this manner, so that I content myself with drawing attention to the fact.

PART XIX.—*The national debt.*

The national debt amounted at the end of March, 1910, to £271,000,000, or about £5 2*s.* *per capita.* About 60 per cent. of the total is accounted for by loans raised for purposes of war during 1905 and 1906. Of the remainder, nearly 20 per cent. added during the last three years is attributable to the nationalisation of the railways.

In 1906 a scheme of redemption was drawn up for the repayment of all debts incurred during the war with Russia within about thirty years, and in pursuance of the plan it was decided, commencing with the year 1909, to transfer to the normal sinking fund at least yen 50,000,000, say £5,000,000, per annum, plus the amount saved in interest on each annual sum redeemed. The task thus heroically undertaken is equal, bearing in mind the difference in wealth and resources, to that which would be imposed on our own people by a redemption of the national debt of the United Kingdom at the rate of £40,000,000 to £50,000,000 per annum.

The fulfilment of this redemption programme requires and depends upon a continuance of present scale of taxation for many years to come, and doubts are sometimes raised as to the ability of the people to stand the prolonged strain. The only answer is that the figures relative to savings (Part XVIII) show that in spite of the heavy demands for the public purse there is still a margin available for personal thrift, and that the thrifty have the will to use it.

TABLE 52.—*Outstanding national debts.**

Year ending March 31.	Amount of debt.	Debt per head.		
	£	£	*s.*	*d.*
1879	46,302,000	1	6	4
'89	37,053,000	0	18	6
'99	42,152,000	0	18	3
1904	57,281,000	1	3	1
'05	101,112,000	2	0	4
'06	190,983,000	3	15	5
'07	226,208,000	4	8	5
'08	232,188,000	4	9	7
'09	229,532,000	4	7	3
'10†	271,765,000	5	2	1

* *Financial and economic annual*, 1910, p. 33.

† Although there was actual redemption of debt in the years 1907 to 1910 the total outstanding was increased by the purchase of the railways, for which bonds were issued to the extent of over yen 517,000,000, say £52,750,000 (the sinking fund in Japan, issued by the Finance Department).

The debts outstanding at the end of March, 1910, may be classified as follows:

	£
1. Feudal Government debts	296,000
2. Railways	59,480,000
3. Harbour works, mining, steel works, canals, telephones, &c.	3,921,000
4. Tobacco monopoly	2,207,000
5. Formosan development	3,370,000
6. Consolidation	79,425,000
7. Armaments and war	123,066,000
Total	271,765,000

Of the total existing national debt the following amounts have been raised by loans issued and repayable in Europe :—

	Face value of loan.	Amount of annual interest.
	£	£
1899 4 per cent. sterling loan	10,000,000	400,000
1905 4½ ,, ,, ...	60,000,000	2,700,000
'05 4 ,, ,, ...	25,000,000	1,000,000
'07 5 ,, ,, ...	23,000,000	1,150,000
'10 4 ,, ,, ...	11,000,000	440,000
'10 4 ,, franc loan, say, ...	18,000,000	720,000
Sterling debentures of purchased railway companies	1,400,000	65,000
In addition to the above it is estimated that Government bonds issued in Japan have been purchased by European investors and are now held in Europe to the extent of	5,000,000	250,000
Total, say	153,400,000	6,725,000

The redemption of the foreign loans is to commence in 1911 with a repayment of £1,000,000; thereafter increasing sums will be applied in each year until the present debt is finally extinguished in 1935.

As a set-off to the large expenditure for armaments and war must be placed the acquisition of Formosa and Korea. Both countries are capable of supplying Japan with products which she requires, and though large sums of money will be needed for organisation and development of resources, the annexation of these territories will prove a national advantage.

PART XX.—*Assets of the Japanese Government.*

Through inheritance from feudal times and through the character of its domestic policy, the Japanese Government is in possession of assets, some already producing income, and all potentially of much greater value than the figures at which they can be assessed at the present day. The chief items may be stated:—

	Yen.	
4,543 miles railways in Japan[39]	757,000,000	
271 ,, Formosa[40]	28,000,000	
641 ,, Korea[41]	85,000,000	
706 ,, Manchuria, Government share[42]	100,000,000	
	Yen 970,000,000, say	£100,000,000
The value of Government lands in Japan proper, that is, lands belonging to the State, distinct from those from which it derives land tax, and distinct also from those which are an appanage of the Crown, was stated in 1899[43] to be £82,000,000		£82,000,000

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[39] *The management and finance of the railways of Japan*, issued by the Finance Department, 1910.

[40] *Japan year-book*, 1910, p. 628.

[41] *Second annual report on Korea*, p. 114.

[42] *Financial and economic annual*, 1910, p. 162.

[43] *Handbook of the national loans of Japan*, issued by the Finance Department, Tokio, 1906.

In addition to these assets there are the various Government factories, arsenals, &c. (employing over 125,000 operatives), the salt, tobacco, telephone and telegraph monopolies with their estates, equipment and organisation, and the domains held by the State in Formosa and Korea.

It is impossible to estimate the value of these properties, but taken in conjunction with the railways and lands, the available Government assets are probably fully equal to the existing amount of the national debt.

PART XXI.—*Conclusion.*

1. Feudal methods and conceptions still exercise a powerful influence, exalting official initiative, creating artificial conditions and opposing in many respects the exercise of independent individual effort. Speaking generally the policy is one which concentrates capital and energy in certain channels, bestowing a prosperity which diverts attention for the time being from the greater needs of the country at large. The profits of the subsidised steamship companies are in reality a burden laid upon the tax-payers. On the other hand the extension of railways and telephones, which would benefit the tax-payer, is severely curtailed owing to the exigencies of national finance. The banking system, as at present organised, draws large sums in the shape of profits and is enabled to finance foreign trade, but agricultural interests and internal development suffer from the dearth of funds.

2. While the country has progressed in every direction, the greatest accomplishment has been the complete re-organisation of national life. This re-organisation, together with improved methods of agriculture, now enables a population of 50,000,000 to be maintained where formerly less than 30,000,000 were often in a state bordering upon starvation, and is by itself a noteworthy achievement.

3. The system of small holdings involves a great waste of human labour and is unfavourable to the accumulation of capital for the purchase of labour-saving appliances. At the same time it leads to a continuous increase in the price of land.

4. The population is principally engaged in agriculture, fishery, and forestry, and much of the labour now employed might with the co-operation of capital be set free for the production of "goods" to satisfy the multiplied wants which contact with Western civilization is fast creating. From this it follows that the industrial development already achieved by Japan is only a tithe of what may be expected if favourable conditions are established.

5. There is nothing in the present volume of Japan's trade, or the condition of her industries, which can justify feelings of either

jealousy or alarm on the part of other trading nations. It is true that State organisation has been and is being used to foster Japanese enterprise, and that in certain cases this support creates a formidable competition, but the evil consequences, as well as the costliness, of this policy are slowly and surely coming to the surface and have already received some measure of condemnation both in the Press and in the Diet.

6. There is not so much connection between low wages and cheap production as might appear to be likely. Wages have already increased over three-fold within twenty years, the standard of living is advancing, and as efficiency increases, labour demands still higher rates of pay.

7. Interest on the national debt, together with the large sum voted for sinking fund purposes, constitutes the biggest item in Government expenditure. But though this necessitates a high rate of taxation, the percentage of taxation to production is smaller than that levied in any previous reign. While it is unlikely that there will be difficulty in maintaining the present scale, there is no sufficient basis of wealth or industry for additional taxation, from which it may be deduced that the future policy of Japan must rest upon the peaceful development of her resources, and that this in turn will involve large imports of material and capital for many years to come.

8. The national debt is not only well secured by the valuable assets in the control of the Government, but the sinking fund now in operation provides for its extinction within about twenty-five years. The demands for railway construction and other public works are, however, likely to grow with great rapidity, so that *pari passu* with the redemption of the unproductive debts it will probably be found necessary to contract fresh loans for productive purposes, if not by Government, then by municipal authorities and private enterprise.

I am fully aware that many subjects have been omitted from this survey, as well as of the numerous points arising out of the various tables to which no reference has been made. Such omissions are inevitable in a paper of this nature. The difficulty is to select from the great amount of material in existence such salient features as will present in broad outline the progress of forty years, together with present conditions. So far as I have not succeeded in doing this, my work is imperfect, but I may at least express a hope that the facts and figures here presented will lead to a sympathetic appreciation of the problems confronting the island empire of the East, with which our nation, the island empire of the West, is in such close and friendly alliance.

APPENDIX I.

Rates of exchange.

According to the gold standard, established in 1897, the par value of the yen is a little over 2*s.* 0½*d.* (24·582*d.*). For prior years the following rates have been used (based upon the *Financial and economic annual*, 1902, p. 108).

Year.	Rate of exchange.	Yen per £.
	s. *d.*	
1872–74	4 2	say 4 80
'75–77	4 1	,, 5·00
'78–84	3 9	,, 5·33
'85	3 6	,, 5 70
'86	3 3	,, 6·15
'87	3 2	,, 6·30
'88–89	3 1	,, 6·50
'90	3 4½	,, 5·90
'91	3 2½	,, 6·25
'92	2 10½	,, 7·00
'93	2 6	,, 8·00
'94–95	2 1	,, 9·60
'96–1909	2 0½	say 9·804 or £102 per yen 1,000

APPENDIX II.

*Weights and measures, with English and French equivalents**

Japan.	France	Great Britain.	Approximate equivalent used in conversions.
Ri	3·92727 kilomètres	2·44029 miles	2·44 miles.
Square ri	15·42347 kilomètres carrés	5·95504 sq. miles	5·955 sq. miles.
Cho	99·17355 ares	2·45067 acres	2·45 acres.
Tsubo	3·30578 mètres carrés	3·95371 sq. yards	1,200 tsubo = 1 acre.
Koku, liquid	1·80390 hectolitres	39·68594 gallons	39·70 gallons.
,, dry	—	4·96074 bushels	4·96 bushels.
Kwan = 1,000 momme	3·75000 kilogrammes	8·26733 lbs. (avoir.)	8·27 lbs. (also 271 kwan per ton).
Kin = 160 momme	6·00000 hectogrammes	1·32277 lbs. (avoir.)	1·33⅓ lbs. (also 1,693 kin per ton).
Momme	3·75000 grammes	2·11650 drams (avoir.) 2·41150 dwts. (troy)	1,000 momme = 120·575 ozs. troy.

* *Tenth financial and economic annual.*

APPENDIX III.

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APPENDIX IV.

Imports and exports of merchandise.

TABLE 34.—*Average total value of classified merchandise imported into Japan.**

Average per year	1869-78.	1879-88.	1889-98.	1899-1908.	1909.
	1,000 yen.	1,000 yen.	1,000 yen.	1,000 yen.	1,000 yen.
A. Plants and animals	20	26	52	359	495
B. Grains and seeds	2,338	435	14,696	40,913	28,858
C. Beverages and comestibles	259	394	1,765	10,924	7,586
D. Sugar, confectioneries and sweetmeats	2,686	4,857	13,167	21,531	13,551
E. Alcoholic liquors and alcohol	296	444	1,265	1,263	690
F. Skins, hair, bones, horns, tusks, shells, &c.	353	819	2,006	5,596	6,925
G. Drugs, chemicals and medicines	415	932	2,978	11,110	17,278
H. Oils, fats and waxes	714	2,185	5,903	17,016	18,290
I. Dyes, pigments and paints	444	683	2,566	8,126	10,899
J. Yarns, threads, twines, cordages and materials thereof	4,887	8,135	32,719	97,734	129,705
K. Textile fabrics and manufactures thereof—					
Part 1. Cotton tissues	4,619	3,916	6,852	14,259	13,928
,, 2. Hemp tissues	110	116	180	756	1,017
,, 3. Woollen tissues	4,648	4,069	8,089	12,343	9,080
,, 4. Silk tissues	123	481	615	690	511
,, 5. Others	402	616	1,718	3,606	3,201
Total Group K	9,902	9,198	17,454	31,654	27,737
L. Clothing and accessories	430	392	813	1,724	1,738
M. Paper and paper manufactures	218	387	1 285	5,504	8,714
N. Ores and minerals	156	119	376	5,415	5,670
Part 1. Iron and steel	734	1,730	7,169	25,993	26,946
,, 2. Others	330	585	1,707	7,365	6,764
Total Group N	1,064	2,315	8,876	33,358	33,710
O. Metal manufactures	175	777	2,851	7,872	7,579
P. Earthenware, porcelain, glass and glass manufactures	191	200	520	2,125	3,222
Q. Vehicles and vessels	230	662	5,557	8,204	5,307
R. Scientific instruments	235	541	1,849	2,913	2.630
S. Machinery	254	767	5,166	15,338	20,302
T. Miscellaneous	1,571	1,651	6,571	25,213	40 876
U. Parcel Post	—	—	—	446	1,166
V. Travelling effects	—	—	—	142	213
W. Re-imports	4	42	121	695	1,057
Grand total imports	26,842	35,961	128,556	355,175	394,198

* *Annual returns foreign trade*, 1909; *Returns of foreign trade*, 1868-1908.

TABLE 35.—*Average total value of classified merchandise exported from Japan.**

Average per year	1869-78.	1879-88.	1889-98.	1899-1908.	1909.
	1,000 yen.	1,000 yen.	1,000 yen.	1,000 yen.	1,000 yen.
A. Grains and seeds	979	2,159	5,931	6,036	7,081
B. Beverages and comestibles—					
Part 1. Tea	4,840	6,923	7,400	10,876	13,156
„ 2. Marine productions	1,325	2,606	3,859	7,160	8,471
„ 3. Others	243	487	1,147	4,971	8,369
Total Group B	6,408	10,016	12,406	23,007	29,996
C. Sugar, confectioneries and sweetmeats	—	—	8	2,341	5,280
D. Alcoholic liquors	—	9	218	3,042	4,496
E. Tobacco	164	174	219	1,986	1,763
F. Skins, hair, horns, tusks, &c.	24	197	455	1,557	2,117
G. Drugs, medicines, dyes and paints	437	1,196	2,635	6,917	8,701
H. Oils and waxes	218	429	866	2,771	4,704
I. Yarns, threads, twines, cordages and materials thereof—					
Part 1. Silk	9,429	17,327	37,869	88,817	132,459
„ 2. Others	1	5	4,087	28,049	33,550
Total Group I	9,430	17,332	41,956	116,866	166,009
J. Textile fabrics and manufactures thereof—					
Part 1. Silk tissues	3	71	6,082	28,588	28,923
„ 2. Cotton tissues	8	104	1,373	9,378	17,673
„ 3. Other tissues	9	129	206	390	705
„ 4. Tissues, manufactures of	1	415	4,786	8,085	9,851
Total Group J	21	719	12,447	46,441	57,152
K. Clothing and accessories	8	69	549	5,280	10,079
L. Paper and paper manufactures	47	238	810	3,371	4,961
M. Ores and minerals	573	1,703	7,463	17,688	18,451
N. Metals	643	1,593	5,560	17,739	23,457
O. Metal manufactures	55	436	676	2,288	3,174
P. Earthenware, porcelain and glass manufactures	80	790	1,914	5,705	7,152
Q. Machinery	—	29	223	3,047	3.515
R. Miscellaneous	541	2,255	12,794	39,326	49,350
S. Parcel Post	—	—	—	722	2,535
T. Re-exports	278	619	1,180	3,342	3,139
Grand total exports	19,906	39,963	108,310	309,472	413,112

* *Annual returns of foreign trade*, 1909; *Returns of foreign trade*, 1868-1908.

TABLE 36.—*Total value of merchandise exported to specified countries.**

Country.	Yearly average, 1889-98.	Per cent	Yearly average, 1899-1908.	Per cent	1909.	Per cent.
	1,000 yen.		1,000 yen.		1,000 yen.	
China	11,286	—	69,510	—	89,285	—
Korea	2,713	—	18,592	—	26,998	—
Hongkong	16,965	—	28,922	—	21,676	—
British India	3,110	—	9,205	—	14,426	—
British Straits Settlements	—	—	4,022	—	5,662	—
Dutch India	3	—	1,067	—	3,071	—
French Indo-China	22	—	233	—	440	—
Asiatic Russia	1,027	—	3,478	—	3,388	—
Philippine Islands	146	—	1,610	—	3,163	—
Siam	13	—	337	—	480	—
Total Asia	35,285	32·6	136,976	44·3	168,589	40·8
Great Britain	6,696	—	16,911	—	27,093	—
France	18,260	—	31,735	—	41,520	—
Germany	1,877	—	5,862	—	7,955	—
Belgium	96	—	896	—	1,924	—
Italy	1,918	—	10,470	—	11,999	—
Switzerland	372	—	214	—	1,622	—
Austria-Hungary	367	—	914	—	1,085	—
Holland	182	—	327	—	665	—
Sweden	2	—	7	—	94	—
Other countries	145	—	808	—	2,195	—
Total Europe	29,915	27·6	68,144	22 0	96,152	23·3
United States of America	36,995	—	92,607	—	131,547	—
Canada	1,621	—	3,239	—	3,855	—
Mexico	2	—	245	—	204	—
South America	3	—	44	—	128	—
Total America	38,621	35·7	96,135	31·1	135,734	32·9
Australia	1,137	—	3,658	—	5,812	—
Hawaii	283	—	2,216	—	3,572	—
Egypt	11	—	410	—	841	—
Total	1,431	1·3	6,284	2·0	10,225	2·4
Other countries	3,058	2 8	1,933	0·6	2,412	0·6
Average total exports	108,310	100·0	309,472	100·0	413,112	100·0

* *Annual returns of foreign trade*, 1909; *Returns of foreign trade*, 1868-1908.

TABLE 37.—*Total value of merchandise imported from specified countries.**

Country.	Yearly average, 1889-98.	Per cent.	Yearly average, 1899-1908.	Per cent.	1909.	Per cent.
	1,000 yen.		1,000 yen.		1,000 yen.	
China	17,808	—	46,856	—	65,051	—
Korea	3,860	—	9,155	—	14,139	—
Hongkong	8,409	—	3,958	—	623	—
British India	15,382	—	57,185	—	65,157	—
British Straits Settlements	—	—	1,735	—	2,972	—
Dutch India	166	—	13,572	—	18,632	—
French Indo-China	4,745	—	8,563	—	6,373	—
Asiatic Russia	1,260	—	4,018	—	228	—
Philippine Islands	1,245	—	2,133	—	1,004	—
Siam	667	—	2,695	—	2,595	—
Total Asia	53,542	41·7	149,870	42·1	176,779	44·8
Great Britain	39,613	—	78,187	—	86,228	—
France	4,630	—	5,320	—	5,559	—
Germany	11,165	—	33,563	—	40,217	—
Belgium	1,836	—	8,218	—	6,529	—
Italy	164	—	476	—	519	—
Switzerland	1,381	—	2,626	—	2,179	—
Austria-Hungary	87	—	2,755	—	2,874	—
Holland	62	—	855	—	840	—
Sweden	66	—	679	—	2,024	—
Other countries	135	—	959	—	1,110	—
Total Europe	59,139	46·0	133,638	37·5	148,079	37·6
United States of America	13,560	—	62,936	—	54,043	—
Canada	52	—	661	—	1,083	—
Mexico	—	—	19	—	—	—
South America	4	—	156	—	1,621	—
Total America	13,616	10·6	63,772	17·9	56,747	14·4
Australia	612	—	3,416	—	3,366	—
Hawaii	8	—	11	—	14	—
Egypt	36	—	2,479	—	5,464	—
Total	656	0·5	5,906	1·7	8,844	2·3
Other countries	1,603	1·2	2,989	0·8	3,749	0·9
Average total imports	128,556	100·0	356,175	100·0	394,198	100·0

* *Annual returns of foreign trade*, 1909; *Returns of foreign trade*, 1868-1908.

Discussion *on* Mr. C. V. Sale's Paper.

Sir J. Athelstane Baines, in proposing a vote of thanks to the reader of the Paper, pointed out that the subject was almost entirely new to the Society, for they had never had a Paper upon Japan so full and comprehensive as this, giving a whole series of statistics about that interesting country which, to most of them, was a *terra incognita*, and which, as had been said, had made more rapid progress than perhaps any other country in modern times. The only country with which he could compare it was Egypt since he first knew it in the year after the opening of the Suez Canal; and the advance then was to a certain extent of a cognate character with that of Japan, inasmuch as the Government had taken a more direct part in developing the resources of the country than had been the case elsewhere. In Japan there was another element which had been dwelt upon by the author very acutely, and probably with fuller knowledge than most of them possessed, and that was that the Japanese Government had apparently studied all the modern conditions of which they wished to avail themselves in order to achieve a definite aim, not merely the general development of the resources of the country on the lines of least resistance or the greatest benefit to the country itself, but the carrying out of a general policy which Mr. Sale had described as a policy of independence—in fact, as he had put it, it was the old policy of Japan under a new form. That was intensely interesting, and though, perhaps, the policy had not yet reaped its full results, still it had been in force for such a time that they must all study with the greatest possible interest the land-marks in its progress as shown in the statistics which had been so well placed before them. Those statistics were so comprehensive, and covered such a wide field, that it would be impossible to discuss them all within the limits of one meeting; but he hoped there were some present who could, from personal knowledge, deal with and elucidate some of the points which had been put before them. There were only one or two points on which he felt himself entitled to comment; one of them was the similitude of the conditions of Japan with India in the general concentration of the people on agriculture and the prominent place held by the production of rice. It was noteworthy that the population of rice tracts was, as a rule, denser than that of tracts occupied by any other cereal. Not only was the outturn heavier, but rice was confined to regions almost immune from failure of rainfall. Mr. Sale gave them a figure estimating that about 80 per cent. of the population of Japan was occupied almost entirely in cultivation. That was a little higher than in India, and it appeared to him that this concentration was closely connected with the policy which the Government of Japan had initiated. It was found that a large and increasing population on a small area ought not to be dependent so exclusively on one means of livelihood, particularly on agriculture, which in almost all countries was not conducive to a very progressive civilisation, nor apt to lend itself to the advance of a country all along the line, as a diversity of occupations might do. Anything, therefore, that the Government of Japan did to secure a diversion of at all events a considerable portion of the population from the occupation of rice culture, was for the benefit of the country at large; but the result, of course, had yet to be judged. The test was the prosperity or otherwise of the people; and the author had sufficiently shown (although in his conclusions he summed up rather adversely to the general action of the State) that the result had been generally beneficial in opening up new sources of revenue and new sources of sustenance for a population which it had astonished him to find had advanced so rapidly of late years. No doubt the diversion of the population from agriculture could not be effected without some initiative action on the part of the Government such as had taken place. There was the same problem to be faced in British India, where the Government had on a comparatively small scale attempted to give the people opportunities of pursuing occupations other than the cultivation of the land. Japan had gone even further, and he thought the problem was this: that, if one wanted to take the people more or less away from the land and they were not prepared on their own initiative to provide themselves with other occupations, it was obviously the policy, if not the duty, of the Government to show them, whether by temporary means or otherwise, how to engage in such pursuits as would give the people the opportunity of learning for themselves, and how to put their private capital in the place of that with which the Government had begun the enterprise. On the other hand, the question was raised in the Paper as to whether this population could be spared from the land. That was a matter on which he was not competent to offer an opinion, though it appeared to him that the great waste of labour mentioned, which the author thought might be obviated by using labour-saving appliances, was perhaps legitimately employed in the cultivation of rice. It was mostly the supplementary labour of the members of the family. He recalled a Paper read nine or ten years ago by Major Craigie on small and intense cultivation in Denmark, in which the author said, if he remembered rightly, that 1,000 acres there occupied 73 people, men, women and children, whereas in England the corresponding figure was only 37. That meant, of course, that under the system of cultivation there occupation was found on the farm itself for the men, women and children. In Japan it was very much the same. Rice, especially, was a crop which required a great deal of attention, and afforded an opportunity for every member of the family to engage in it. The other subsidiary occupations to which agriculturists devoted themselves in Japan were, he gathered, mat weaving and so on, occupations in which there could be no foreign competition, since it was almost entirely domestic, and in which the family, or the bulk of the family, was likely to continue whatever members of it were diverted to occupations in towns. Then, again, the question arose whether the factorial development, which had been so marked of late, was really a healthy one. He was inclined to think it was not. There was an enormous preponderance of women and a still greater proportion of children, in the factories. The women were engaged, no doubt, chiefly in textiles as they were in England; still, the proportion of women to men was high, and the proportion of girls to grown up people was extremely high. Several other points occurred to him as needing remark, but these he must leave to others with fuller knowledge of Japan.

Mr. T. A. WELTON, in seconding the vote of thanks, said he noted that a leading feature in the condition of Japan was the extraordinary density of the population. In this country, if the population were engaged so largely in agriculture as in Japan, we should have a density of not much more than 100 per square mile; but in Japan they had a density of over 400 per square mile, which was extraordinary for an almost purely agricultural population, with a great proportion of forest land. The author had drawn attention to the fact that the expenditure of human labour in a variety of ways was very great; and it was worth noticing that the advance in the price of food was very nearly matched by the advance in wages. It seemed to him that the price of food almost necessarily moved with the wages, because the crop had been apparently able to be increased in due proportion to the number of the people; and the price of food must necessarily be so adjusted that the nation could take up that food. The vast proportion of food must necessarily be within the power of the population to buy, or it would go to waste. The wages seemed to be about one-third of what they were in this country. He noticed that the Japanese banking system seemed to be very unlike our own. There almost all, if not all, the deposits were employed in loans, but this could not be done here without considerable danger. Probably the reason why that was possible was the protective influence of the Government over all their affairs, which prevented those panics to which we might be liable. It naturally meant a very much larger proportion of actual profit than was possible for English banks, which only employed part of their resources in loans, to realise; in fact, the profits of our banks could be doubled if they were able to do as much as was done in Japan in the way of loans. The taxation, which was put at over 20 per cent., was not such a great deal heavier than what we were accustomed to, if one added the local to the general taxation; and, considering that it included practically the rent of the land, as far as he could see, the Japanese had rather a lighter burden to carry than we had. The impression made on his mind by the Paper was that Japan must be regarded from our point of view as a practically young country with enormous possibilities of development. The Japanese nation had hardly begun to move in the path they had to traverse, and they would probably reach an enormously greater development. At the same time he agreed with the author that the possibilities of competition were much less than was sometimes feared, and he thought there was no ground for jealousy or apprehension with regard to Japanese competition.

Mr. Rew said the Paper was obviously one more suitable for reading quietly when printed in the *Journal* than for discussion. There was, however, one observation he would like to make, and that was with regard to one of the figures in the section devoted to agriculture which had caught his eye. The author there quoted a figure, for which, of course, he was not responsible, of 1,220,000,000*l.* sterling as the value of agricultural land and stock in the United Kingdom. That figure placed in juxtaposition with the figure for Japan suggested that the total value in Japan was higher than that in the United Kingdom. Mr. Sale cautioned them that the figures were not necessarily comparable; and without close examination of both it would be difficult to say how far they each covered the same ground; but, so far as the figure for the United Kingdom was concerned, it seemed to him that it must be understated. Roughly, it included the value of agricultural land and of farmer's capital. The capital value of agricultural land could only, so far as he knew, be computed by taking Schedule A of the income tax and multiplying that figure by a factor representing a certain number of years' purchase. Of course opinions might differ as to what number of years' purchase should be taken; but supposing, for the sake of argument, they took twenty years, they would get a value of about 1,050,000,000*l.*, while if they took twenty-five years they would get about 1,300,000,000*l.* as the capital value of agricultural land. To that must be added the value of the farmers' capital, which was also, of course, a matter of estimate. He happened to have made some investigations on that subject some years ago, and the figure he arrived at for the United Kingdom was something over 300,000,000*l.* By any method of calculation it would be seen that the figure given in the table for the United Kingdom must be below the mark.

Mr. Paish said he would like to thank Mr. Sale for his excellent Paper, which threw a great light on the history, progress, and present position of Japan. He wished, however, that the author had told them a little more about the effect produced by the recent war on the economic position of Japan. A country that had borrowed for war the great sum of money that Japan had done, and had to send the interest abroad, had a hard task to perform. Japan was not a rich country, and the burden of having to pay some 7,000,000*l.* a year to Europe for interest was not a light one. He had no doubt that the payment of this interest on a debt incurred for an unproductive purpose, and one which, therefore, did not add to the wealth production of the Japanese, had influenced the fiscal policy of the country in recent years. Japan had to provide the interest, and in order to do this she had to increase her exports or diminish her imports; and he thought that the influence of the interest payments had had something to do with the effort of the Japanese Government to check imports and to stimulate exports. He noticed, however, that both the imports and exports had grown, and that there had not been a greater expansion in exports than in imports. He thought that must be due to continued borrowing by the Japanese Government. He had no doubt of Japan's ability to meet the interest on her debt, and the efforts which the Japanese Government was making to stimulate the exports of the country increased his confidence in Japan's ability to meet any obligation she incurred. He would be glad if Mr. Sale could give them any information on this point.

Mr. SALE expressed his warm thanks for the very patient attention with which the Society had listened to a very lengthy Paper. While thanking those who had taken part in the discussion for the instructive and illuminating comments they had made on various points, he regretted that there was not time to go very closely into the questions raised. Sir Athelstane Baines had referred to the large percentage of female labour in Japan: the Japanese Press had lately commented on the subject, and had noted the fact that the exports were principally produced by female labour. With regard to the value of land in Great Britain, his figure might possibly be under the mark; but the point was this—the national wealth of Japan might be stated as being somewhere about one-eighth or one-tenth of that of the United Kingdom; but the average price of land per acre was much the same in both countries, and therefore far higher in proportion to the means of the Japanese than in our case. With regard to Mr. Paish's enquiry about the effect on Japan of the finance in connection with the late war, that was a very difficult subject; he had tried to work it out, but found the Paper becoming so lengthy that he gave up the intention. As Mr. Paish had said, it was quite true that, so far, the interest had been practically paid out of fresh borrowings; nevertheless, he thought if they could analyse the figures of trade, not only the actual merchandise but the invisible services, which were a very large factor, they would find that Japan was really paying its way, and that when the time came, as it would soon, when she would have actually to provide out of trade balances the hard cash to pay the interest on her debt the cash would be there.

The following candidates were elected Fellows of the Society:—

Austin Russell Campbell.
Harold Hjalmar Heaton.
William George Towler.
Allyn A. Young.

MISCELLANEA.

A Suggested Short Method of Constructing Life-Tables for Infants Under One Year of Age. By Reginald Dudfield.

This note is an outcome of inquiries as to the best method of constructing life-tables for children under five years of age, by days up to the end of the first week, by weeks up to the end of the first month, by months up to the end of the first year, and thereafter by years.

The Medical Officer of Health of the County of London has published life-tables for the first year of life since 1905, showing the numbers of survivors at each month. He has been good enough to supply particulars of the method adopted in his office, from which the following scheme has been drawn up, it being assumed for the sake of clearness that the table is to relate to the year 1910.

I. The first step is to determine the *population at each age* (B_x), it being assumed that no deaths occur.

At ages under one month the population (B_0) will be the sum of half the births registered during December, 1909 + the births registered during January–November, 1910 + half those registered during December, 1910.

At ages between one and two months the population (B_1) will be the sum of half the births registered during November, 1909 + those registered during December, 1909–October, 1910 + half those registered during November, 1910.

* * * * *

At ages between eleven and twelve months the population (B_{12}) will be the sum of half the births registered during January, 1909 + those registered during February–December, 1909 + half those registered during half January, 1910.

II. Next the *population at risk* (P_x) has to be found.

At ages under one month that population is the same as that determined above, *i.e.*, $P_o = B_o$.

At any age above one month $P_x = B_x - \Sigma D_{x-1}$, where ΣD_{x-1} represents the sum of the deaths at all ages below x during the year 1910.

III. The *probability of survival* (p_x) is obtained by the formula

$$p_x = \frac{P_x - D_x}{P_x}.$$

IV. The L_x column is obtained in the usual manner, and requires no explanation.

The foregoing method appeared to be somewhat lengthy, and, moreover, did not afford any indication of the way in which populations at ages less than one month could be determined. To build up such populations by weeks would entail very considerable labour, and the value of the figures so obtained would, it is thought, be doubtful. Further, it should be remarked that no returns are published giving monthly totals of births. In the scheme given above groups of four (or five) weeks have to be taken as representing months.

Casting about for a simpler method, that now to be described has been thought out. It has been tested by comparisons with the results of the method already described, which are to be found in the Annual Reports of the Medical Officer of Health of the County of London.* As will be seen later, the survivors at the age of one year obtained by the two methods are in very close agreement, but it has been thought desirable to submit the proposed (shortened) method to criticism before using it in the construction of life-tables on the lines mentioned in the first paragraph of this note.

Knowing the number of births registered in any period (in the appended tables a year of fifty-two or fifty-three weeks), and the number of deaths at each of the selected ages, a column of "survivors" (S_x) was first constructed by successive subtractions of the deaths (see Table 1). Thus S_o = the number of births registered, $S_1 = S_o - d_o$, &c. From the S_x and d_x columns the rate of mortality per unit or probability of dying (q_x) was obtained; and since $p_x = 1 - q_x$, the probability of survival values were obtained by subtraction. The L_x column again requires no explanation.

The first test was that made against the table for 1909, and the difference in the numbers of survivors at the age of one year given by the two methods was an *apparent* deficit of 274 lives by the proposed short method, equal to 0·31 per cent. of the total given by the longer method (Table 2).

As further tests, the $l_{x+\frac{1}{2}}$ and m_x values were determined from the same S_x, d_x columns, new p_x values (designated p'_x and p''_x, respectively) were calculated therefrom, that from the m_x values being obtained by the use of the formula $p''_x = \frac{2 - m_x}{2 + m_x}$. The survivors obtained by the use of the p''_x values showed an apparent deficit of 283 lives (equal to 0·32 per cent. of the total by the longer method), and those obtained from the p'_x values an apparent surplusage of 398 lives (equal to 0·44 per cent.).

To make sure that the closeness of results found in the case of one year (1909) was not an accident, tables for each of the years 1905-08 were constructed, using only S_x, d_x and q_x values (see Table 2). The differences in the numbers of survivors at the age of one year thus determined from those published in the Reports already referred to range from − 0·09 to − 0·28 per cent.

Finally the "run" of the numbers of survivors obtained by the two methods during the five years 1905-09 has been compared

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* *Annual Report of the Medical Officer of Health of the County of London for* 1909, p. 23. The results for the years 1905-08 are all to be found at the place quoted, and should be preferred to the results given in earlier reports, as an improvement in the method of calculating the population at each age has been introduced.

(Table 3). The changes in the two sets are practically identical, so that it would appear to be justifiable to conclude that the proposed short method is sufficiently accurate to be used in the manner proposed.

It is no small advantage that this shortened method renders the construction of tables for *any* subdivision of ages perfectly easy. It is only necessary to group the deaths according to the age-division for which it is desired to construct the table.

TABLE 1—*Year* 1909.

Ages.		S_x	d_x	$\left(\frac{d_x}{S_x}\right)$ q_x	$\left(1-\frac{d_x}{S_x}\right)$ p_x	L_x
Weeks	0—	116,559	2,535	·02174	·97826	100,000
	1—	114,024	612	·00536	·99464	97,826
	2—	113,412	540	·00476	·99524	97,302
	3—	112,872	471	·00417	·99583	96,839
Months	1—	112,401	1,346	·01197	·98803	96,435
	2—	111,055	1,060	·00954	·99046	95,281
	3—	109,995	912	·00829	·99171	94,372
	4—	109,083	764	·00700	·99300	93,590
	5—	108,319	676	·00624	·99376	92,935
	6—	107,643	624	·00579	·99421	92,355
	7—	107,019	625	·00584	·99416	91,820
	8—	106,394	661	·00621	·99379	91,284
	9—	105,733	611	·00577	·99423	90,717
	10—	105,122	626	·00595	·99405	90,193
	11—	104,496	623	·00596	·99404	89,655
Survivors....................		—	—	—	—	89,121

Ages.		$l_{x+\frac{1}{2}}$	$\left(\frac{l_{x+1}}{l_x}\right)$ p'_x	L'_x	m_x	$\left(\frac{2-m_x}{2+m_x}\right)$ p''_x	L''_x
Weeks	0—	115,291	·98635	100,000	·02198	·97825	100,000
	1—	113,718	·99493	98,635	·00538	·99463	97,825
	2—	113,142	·99526	98,135	·00477	·99524	97,300
	3—	112,636	·99193	97,670	·00418	·99582	96,837
Months	1—	111,728	·98923	96,882	·01204	·98803	96,432
	2—	110.525	·99107	95,838	·00959	·99045	95,278
	3—	109.539	·99234	94,982	·00832	·99170	94,368
	4—	108,701	·99337	94,254	·00702	·99300	93,585
	5—	107,981	·99398	93,629	·00626	·99375	92,930
	6—	107,331	·99417	93,065	·00581	·99420	92,349
	7—	106,706	·99397	92,522	·00585	·99416	91,813
	8—	106,063	·99400	91,964	·00623	·99378	91,277
	9—	105,427	·99413	91,412	·00579	·99422	90,709
	10—	104,809	·99403	90,875	·00597	·99404	90,185
	11—	104,184	(*·99403*)	90,332	·00597	·99404	89,647
Survivors.		—	—	89,793	—	—	89,113

TABLE 2.—*Survivors at ages* 1—12 *months.*

[Short method, Roman figures. Long method, *italic* figures.]

Ages (months).	1905.		1906.		1907.		1908.		1909.	
	L_x	L_x	L_x	L_x	L_x	L_x	L_x	L_x	L_x	L_x
1—	96,112	*96,188*	96,272	*96,320*	96,108	*96,219*	96,412	*96,437*	96,435	*96,567*
2—	94,694	*94,795*	94,919	*94,983*	94,808	*94,953*	95,138	*95,173*	95,281	*95,450*
3—	93,580	*93,701*	93,785	*93,859*	93,822	*93,990*	94,153	*94,196*	94,372	*94,568*
4—	92,624	*92,761*	92,761	*92,845*	92,949	*93,137*	93,311	*93,360*	93,590	*93,809*
5—	91,809	*91,958*	91,896	*91,988*	92,274	*92,475*	92,580	*92,633*	92,935	*93,172*
6 -	91,033	*91,194*	91,031	*91,130*	91,698	*91,910*	91,927	*91,985*	92,355	*92,605*
7—	90,297	*90,466*	90,254	*90,360*	91,103	*91,326*	91,327	*91,391*	91,820	*92,077*
8—	89,623	*89,799*	89,520	*89,631*	90,544	*90,774*	90,778	*90,847*	91,284	*91,546*
9—	88,928	*89,110*	88,840	*88,956*	89,981	*90,217*	90,221	*90,295*	90,717	*90,983*
10—	88,260	*88,444*	88,133	*88,254*	89,431	*89,670*	89,701	*89,779*	90,193	*90,461*
11—	87,612	*87,797*	87,513	*87,639*	89,911	*89,153*	89,178	*89,259*	89,655	*89,927*
Survivors	87,055	*87,238*	86,882	*87,012*	88,355	*88,598*	88,648	*88,730*	89,121	*89,395*

Note.—The tables published by the Medical Officer of Health of the County begin at 0—1 month. The survivors at ages prior to 1—2 months cannot, therefore, be compared.

TABLE 3.—*Survivors at end of first year of life.*

	1905.	1906.	1907.	1908.	1909.
"Short method"	87,055 100	86,882 99·8	88,355 101·4	88,648 101·8	89,121 102·3
"Long method"	*87,238* *100*	*87,012* *99·7*	*88,598* *101·5*	*88,730* *101·7*	*89,395* *102·4*

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Royal Commission on the Poor Laws and Relief of Distress.* Appendix Volume XXXIII. "*Foreign and Colonial systems of poor relief, with a memorandum on the relief of famines in India.*" (Cd–5441). H.M. Stationery Office, 1910. Price 3*s.* 9*d.*

The knowledge of what has been tried and what is being done by other countries in the way of dealing with subjects of social importance is always interesting and generally instructive, whether as a signpost or a danger signal. In Russia, indeed, half a century ago, when there was a distinction, not altogether conventional, between the person imbued with Western culture (*l'homme civilisé*) and the rest, it was the invariable custom to start any project of innovation or reform with an elaborate inquiry and exposition of what had been done in the matter by foreign Governments. In this country recourse to such investigations has not been as frequent as it perhaps should have been, except within comparatively recent times; but now the tide seems to have turned. In regard to the relief of the poor, about which the last inquiry abroad was apparently made in 1872, the delay may fairly be deemed justifiable, as in most of the countries likely to yield useful information the system of relief has been organised or materially reformed within the last forty years or so. Moreover, in most of the instances quoted in the volume under review, the changes have been very largely in the direction of special branches of the subject, and have not grappled with the general underlying principles of relief. The provisions made, therefore, are more or less experimental, and they are also dependent, obviously, upon local conditions of administration, tradition, and temperament to an extent which interferes with their adaptability to a different atmosphere. On the former point, the reviewer of the vast amount of data here collected remarks that, with perhaps one or two exceptions, no country has yet succeeded in devising a poor law system which is considered satisfactory—presumably by the authorities in the country in question; and for this conclusion he gives reasons based on both general principles and specific facts. As to the details of prescription and practice, the primary information was obtained through a series of questions addressed to the various Governments. Before the meaning of the answers could be fully appreciated, however, it was found necessary to supplement these data with an account of the general system of relief in each country, fortified with citation of laws and executive ordinances, all of which occupy the greater part of the volume. This mass of fact and history is for the specialist, but to the "general reader" the work is made palatable by the very interesting and valuable summaries added by Mr. C. Adair Hore, of the Local Government Board, to whom the preparation and editing of this appendix was entrusted. The prefatory remarks in particular, and the classification of the different systems which immediately follows them, are well worth attention. The whole field is here reviewed in the fulness of experience and study. General tendencies are acutely disentangled from the embarrassing minutiæ of administrative machinery; and the breadth of view and general fairness of his treatment of the subject are by no means impaired by his not withholding from his readers opportunities for forming a pretty accurate surmise as to what he himself thinks about it all. From the communities to which the bulk of this volume refers it is a far cry to India, especially as in the latter country, owing partly to the light demands of tropical life, still more to the influence of the caste-tie, no system of public relief is found necessary in ordinary circumstances. When called for, moreover, by a wide-spread calamity such as famine, the principles and methods of alleviation differ from Western experience as much as do the physical and social conditions. The distress is temporary, and there is no question of chronic relief. It is not localised in a certain industry, as was the great cotton famine of half a century ago, but, like the potato famine of an earlier date, it affects the whole country side. The relations between the landed interests and the State, too, entail on the part of the latter an immediate and close responsibility, not known to the West. It is true, as pointed out by the chairman of the Commission, that the principal subjects for consideration in the case are the peasants and their labourers, but the dependence of the drought-stricken tract is by no means restricted to these classes. Where the population is congregated into independent village communities the whole prospers or suffers with the harvest, and measures of relief accordingly must take into consideration all the primitive industries of such communities, albeit not directly connected with Mother Earth. The link, then, which the chairman may be held to have been well advised in indicating between Indian famine administration and the problems which the Commission had immediately before it is to be found not in the character of the measures summarised in this section of the Appendix, but rather in the manner in which the subject was handled by the Indian Government. The thorough preliminary investigation of details; the careful choice of the general principles to be applied; the adaptation of the means of giving effect to those principles to greatly varying local conditions, and the adequate preparation for mobilising the forces of relief as soon as their services are required—all these matters bear the impress of experience, and are thus not without their interest in regard to the general questions involved. The long acquaintance of the chairman with the problems of Indian administration brought home to him, no doubt, the extraordinary increase of late years in the efficiency of the measures taken for the mitigation of the inevitable hardships of serious failure of crops: but the improvement can only be appreciated to the full by those who, like the present writer, remember their empirical famine work in the last generation, and can compare it with the task of their successors, which, though in no wit less arduous and responsible, has been rendered by system and foresight incomparably more effective. J.A.B.

2.—*Forest resources of the world.* By Raphael Zon, Chief of Sylvics, United States Department of Agriculture. Forest Service, Bulletin 83. Washington, 1910.

This bulletin of some ninety pages is intended to give a review of the forest resources of the different countries of the world. It consists of a considerable mass of statistics on the subject, each country being treated separately; and such information as the author was able to collect, nearly entirely from official sources, is given for each, regarding area under forests, estimates of the present stand of timber, annual cut, imports and exports, consumption, prices, &c.

Unfortunately the data included in the bulletin are so out of date as to be of comparatively little value at the present time. The great bulk of the information does not come down beyond about 1900 or 1901, except in the case of a very few countries. Recent issues of annual reports have mostly been ignored: *e.g.*, the references given at the end of the work, relating to Great Britain, enumerate the Statistical Abstracts issued by the Board of Trade for 1900, the Agricultural Returns of 1900, &c. For this country accordingly the data as to area of woodland do not come down beyond 1895, nor values of imports beyond 1900. Some prices in 1902 have been quoted from the evidence taken by the Departmental Committee in that year, and a few more from the *Transactions of the Royal Scottish Arboricultural Society* for 1906, while the author, as appears from a footnote, is acquainted with Sir W. Schlich's "Manual of Forestry"; but these seem to be almost the only later works dealing with British forestry that have come within his cognisance.

Nor can the data given be regarded as by any means conclusive. On p. 9 Austria-Hungary is stated to be the greatest exporting country in the world. This statement does not, however, carry much conviction when we find the exports given on p. 15 as 320 million cubic feet on the stump, while Canada's exports are quoted two pages later as 613 million cubic feet in 1891. Nor is the reader helped by the international table on p. 73, which gives Russia's net exports as 295 million cubic feet, Sweden's as 223, Austria-Hungary's as 183½, and Canada's as 107 million cubic feet (averages of 1897-1901). A bad blunder is made on p. 59, where Australasia is credited with a forest area of 19·8 per cent. of the total surface; this figure is obtained by the simple process of adding together the percentages in the seven Colonies and dividing by seven. (The true figure is about 5 per cent.) A table (p. 70), in which an attempt is made to show what countries are overcutting, appears to be very loosely compiled. Where data are insufficient the country is set down as cutting exactly its annual growth: *e.g.*, the United Kingdom is credited with an annual growth and cut of 45·5 cubic feet per acre. The latter estimate is taken from a German source, and the annual cut is based upon the following logical process of reasoning: "Assuming that in England only the annual increment is cut, the annual growth would be equal to the total cut." For Canada the annual growth is given as 20 cubic feet per acre, the annual cut as 17, "plus great fire loss, estimated at 170 cubic feet per acre." As the average stand is estimated (p. 16) at only 2,000 feet, b.m. per acre (a measure representing a much smaller amount of cubic feet), it follows clearly, these data being apparently ten years old, that there can now be no forests left in Canada!

On the whole—although we may agree with the conclusion that there is a prospect of a shortage of timber, and that the United States Government should apply proper management to the permanent forest land before it is too late—the bulletin cannot be regarded as establishing a statistical basis for the argument.

R.H.H.

3.—*Inleiding tot de Beoefening der Statistiek.* By Dr. C. A. Verrijn Stuart. (Erste Deel: De statistische methode en hare toepassing op het gebied der demografie.) 383 pp. Haarlem: Bohn. Price (bound) 7.25 fl.

The rising interest in social problems has caused a change in the general attitude towards statistics. The press is now apt to give prominence to statistical information, where formerly newspapers rarely inserted more than statistical jottings in columns containing miscellaneous notes. This indicates a desire to study statistical methods and applications, from which arises the need on the part of an increasing number of Dutch students of economics of a textbook on the subject. It is for them, and not for the professional statistician, that Dr. Verrijn Stuart's book is intended.

The author purposes (not altogether with success) to leave, as far as possible, historical and mathematical details to historians and writers of treatises on the law of probability. He refrains, likewise, from entering deeply into the much-debated question of the scope and status of statistics. The first half of the volume treats of statistical methods in the abstract (Bernoulli's theorem, the collection of materials, means and percentages, graphic methods), concluding with two long historical chapters, and a brief account of international organisation in the sphere of statistics. In Part II a classification of practical problems suited to statistical treatment leads the reader to expect the future appearance of further volumes by the same author, dealing respectively with statistics of intellectual characteristics (religion, criminology, &c.), of economic life (occupations, distribution and consumption of wealth, labour questions, &c.), and of the activities of the State (elections, education, &c.). The present volume is concerned, as regards the application of statistical methods, exclusively with physical conditions and developments.

Thus, in considering the existing state of population, he merely discusses actual numbers and methods of enumerating population, the density of population in various parts of the world, and the growth of population in different countries, and describes investigations into the composition of the population according to sex, age, civil status, nationality and physical condition (anthropometrical investigations, statistics of physical defects, &c.). Statistics of births, marriages, deaths and migration are dealt with in a section on variations in population.

Although prominence is given to conditions in Holland, the book is throughout thoroughly international in scope.

Appended are copies of the Dutch census form, and the forms used for the notification of births, deaths and marriages. S.S.

4.—*Le calcul mécanique : appareils arithmétiques et algébriques intégrateurs.* Par L. Jacob. xvi + 412 pp., 18mo. Paris: Octave Doin, 1911. Price 5 fr.

This is one of the small volumes of the Encyclopédie Scientifique, supplementing two volumes already issued on Numerical Calculation by M. de Montessus and M. d'Adhémar, and on Graphical Calculation by M. d'Ocagne. As will be seen from the title, the author has endeavoured to cover in the space at his command all forms of mechanism for performing numerical calculations, whether these are limited to the simpler operations of arithmetic or no. The first part is devoted to instruments and mechanisms for performing arithmetical calculations, either exactly as with the abacus, Napier's "bones" and arithmetic machines, or approximately as with the slide rule: the second part to algebraical machines such as difference engines, mechanisms for the solution of equations, etc.: and the third part to integrators. The volume contains much that will not readily be found elsewhere, and will be of interest to the mathematical statistician who likes to know something of the various methods that have been devised for alleviating arithmetical work by the use of mechanism or instruments, but in some respects we fear he will find the volume not altogether satisfactory.

The ground to be covered is, in fact, too great for the space at the author's disposal—for fairly complete treatment two volumes at least might well have been devoted to the subject—and the wisest course does not always seem to have been chosen in view of the necessary selection and compression. The limitation of cost, moreover, all the volumes of the series being issued at a uniform price, seems to have rendered it impossible to devote an adequate sum to the reproduction of the numerous figures. The half-tone blocks of mechanism are frequently so "fuzzy" that most of the detail has been lost, so that it is impossible to follow the descriptions in the text, and even some of the line drawings have been so much reduced in scale that a magnifier is almost necessary to read the figuring or grasp the construction. A division of the matter into two volumes might have rendered possible some improvement in this respect also. If a second edition is called for, as we hope may be the case, perhaps it may be found possible to accept this suggestion. If, however, it is desired to retain the limits of a single volume, it would be better to eliminate some of the descriptions which are at present so curt as to serve no useful purpose, and the corresponding figures could go with them. It is surely of little service, for example, to give merely a catalogue cut of Büttner's arithmometer, a single view with no description at all of Grant's machine, or a picture of Selling's machine with a description so brief that it does not even call attention to the essential and novel feature of the mechanism—the use of the "lazy-tongs" for giving the partial products. The space saved in this way might enable the author to substitute for the lists of names and dates at the ends of the chapters references to the original memoirs, or to other works, in which descriptions of the mechanisms cited could be found; the short bibliography at the end of the volume is useful, but insufficient. Should a second edition be issued it will also be possible to correct the spelling of the names given. Mehmke frequently appears as Memhke, A. Sharp as Scharp, Hele Shaw as Hele Schaw or even as Helle Schaw; such numerous errors in names should have been avoided. G.U.Y.

5.—*Child problems.* By Geo. B. Mangold, Ph.D., Associate Director, St. Louis School of Social Economy. (The Citizens' Library.) New York: The Macmillan Co., 1910. Price 5*s.* 6*d.*

"The chief purpose of this book is to give its readers a general view of the principal social child problems of to-day." There is probably scarcely any subject about which there is so much diversity of opinion as that of child rearing, using that phrase in its widest sense. Yet the author has attempted to give a general outline of the whole problem in a book of some 380 pages, small octavo, in which he has sought to produce a work adapted "to the use of the student engaged in college or university work, and also to the general reader who wishes to cultivate this important field of social endeavour." Such two-fold objective in book-making is always risky, and we incline to the opinion that the author has not escaped scot-free.

The book opens with an introductory chapter giving a brief general survey of the subject, which is then dealt with in more detail in five "books," headed (i) infant and child mortality; (ii) recent aspects of educational reform; (iii) child labour; (iv) the delinquent child; and (v) the dependent and neglected child. Of the five "books" the first alone gives any statistics, and very few there. Indeed, there is practically nothing to criticise from a statistical point of view, except to note that the rates in the principal table of mortality (page 45) are for the year 1900, and that there are none of later date. We also note the use of "mean age at death" as a standard of classification of the diseases of childhood, which should be determined by morbidity rates, and of the proportions of deaths under one and under five years to the deaths at all ages, a practice which has been condemned as fallacious.

Statistics apart, there is much in the book to interest readers in this country. In each of the "books" ii–v a good deal of useful information can be obtained, principally by way of contrast between the methods adopted in the United States and here. In the former country the prevention of infant mortality appears to be undertaken more energetically and thoroughly than here. On the other hand, the conditions of child labour are much worse in the States, over one and three-quarter millions of children between the ages of 10 and 15 years being "occupied" at the date of the census of 1900.

American views on education are always stimulating, education in the United States being generally in advance of that in this country. The author has a good deal to say on that vexed question of medical inspection, and its corollary, medical treatment, of school children. He advocates a separate service, apart from the educational and health services, to take charge of the work. In the matter of education reform, he has overlooked one important part of the question, viz., the real efficiency of present methods to secure "education" as distinct from "instruction." That the latter is the main result is, we think, indicated by the eagerness displayed by the children to escape from school and take up work, a fact on which the author lays considerable stress. R.D.

6.—*The Imperial Organization of Trade.* By Geoffrey Drage. xviii + 374 pp., 8vo. London: Smith, Elder and Co., 1911. Price 10*s.* 6*d.* net.

This book, if all of it was not actually written "for the occasion," has at any rate been published "at the present time," as the author himself states in his Preface, "with a view to advancing the closer Union of the Empire in trade matters" at the approaching meeting of the Imperial Conference. In the course of an Introduction and Conclusion, and five further chapters bearing respectively the significant titles of Free Trade, Imperial Preference, Retaliation, Tariff Reform and General Tendencies in the United Kingdom, Mr. Drage attempts, with the help of many quotations from the utterances of prominent public men, and of an abundance of facts and figures drawn mostly from official sources, to supply an opportune review, made from the standpoint of a detached but attentive observer, of the various pros and cons of what is commonly described as the fiscal controversy. He points out indeed at the beginning of his essay that much is imperatively needed, and that, with the expenditure of some concentrated study and persevering effort, much could speedily be accomplished, in such a direction as uniformity of legislation throughout the Empire on naturalisation, patents, trademarks, currency, weights and measures, and the like; or, again, in the achievement of greater uniformity of administration, which, as he urges, is obviously lacking in that particular matter of the collection of trade statistics where it might prove of sensible advantage, assiduity and knowledge are alike demanded. To these pertinent considerations he returns at the close of the volume; nevertheless, as he argues with force, the satisfactory settlement of such minor problems would still leave open the question which rightly, or inevitably, dominates the rest. That is uniformity of trade policy; which is accordingly the main subject that he handles.

Readers of the book would probably be prepared to find that little novelty is possible in the presentation of both sides of a case which may almost be said to have been by now worn threadbare in consequence of the prolonged discussions of the last eight years. But, while the author accepts, for instance, from Professor von Schulze-Gaevernitz the suggestive view that this country is tending to become a "Rentner Staat," an increasing proportion of the inhabitants of which will live in comparative idleness on the interest drawn from foreign investments, there is, we believe, originality in his conclusion that one remedy for this state of affairs, which we understand him to regard rather as a symptom of regrettable decadence than as a fitting object for the complacency sometimes exhibited, will be found in a hardening of the race by increased employment in the active work of shipping. The attitude, however, adopted by him upon this topic is so far characteristic of that which he endeavours to preserve in the other portions of his treatment that he honestly strives here as throughout to be impartial. The "convinced Free Trader" might indeed, we suspect, with unconcealed reluctance extend a grudging recognition to some of the concessions made by Mr. Drage and to some of the reservations introduced and emphasised. But on the whole perhaps he would rise from the perusal of the volume less dissatisfied than his opponents in the fiscal controversy. For Mr. Drage's final conclusions would certainly fail to win the approbation of the thorough advocates of Preference or of Retaliation; and, if he has not in fact succeeded in the superhuman task of ridding his mind of all *parti pris*, such bias as he shows inclines in the direction of the "orthodox" traditions, which for many years have held in willing bondage the intellects and reasonings of many, if not most, English economists. It is a hard saying, savouring too much of partiality, to remark with such positiveness as Mr. Drage employs that "no sufficient proof has been advanced from an economic point of view to show that a system of preference for Colonial produce is feasible, or that it would promote the closer union of the Empire or further the trade of the United Kingdom." Nor again would the ardent Tariff Reformer credit the assertion that it was a judge, and not an advocate, who was speaking, when he heard our author arguing about the "special danger of diverting the attention of our manufacturers" from the markets of the principal protected foreign countries "by such attractive ideas as Protection or Imperial Preference, when they ought to concentrate their whole energy on competition in their business."

Still he does, according to his powers, endeavour to bring "light" rather than "heat" to bear upon his statement of the present situation, as well as on his narrative of that past history of which it is the outcome; and, whether we are Free Traders or Tariff Reformers, we should all concur in his sane and pertinent observation that the question of the imperial organisation of trade raises a host of varied points, needing careful study and judicial measurement of the relative validity of different arguments. We should assent no less cordially to his declaration that the problem has now become larger than Mr. Chamberlain perhaps conceived, when he opened the debate in 1903. But we should also note that events move quickly, and that, in the course of the controversy itself unforeseen developments have opened new *aperçus.* Had the publication of this very book been postponed for a few months only Mr. Drage himself would probably have found it necessary to recast some of his sentences on the possibilities of Canadian and American Reciprocity; and perhaps the reconciliation between the views of the Prime Minister of the Dominion and of the Leader of the Canadian Opposition, quoted on his title page, has already become less easy to accomplish than he represents or considers it to be. The urgency, however, of an early and a satisfactory solution of the fiscal problem has not diminished, and this book may conceivably help to that desirable result. If so, the pains Mr. Drage has evidently taken to produce a full, readable and accurate account of the *status quo* will be suitably rewarded. It certainly should now find a place on the shelves set aside for fiscal literature. L.L.P.

7.—*Die Deutschen Anleihen.* Von Hugo Heyman. Berlin: Puttkammer und Mühlbrecht. Price 5 m. 40 pf.

This book has a wider scope than its title implies. Instead of dealing merely with German loans it discusses the financial conditions of the Empire as they now exist. It also enters into most useful and opportune comparisons of the public finance of Germany, England and France. For us this is a specially valuable exercise. We find ourselves called upon to measure our financial and economic strength against nations which are becoming keen rivals to us commercially and otherwise. This rivalry, as yet pacific, may develop into something much worse, but putting aside that ultimate and final issue, there is much need for nations to realise their relative positions in the international struggle for power and influence. Germany has forged so rapidly to the front, and is now so frankly determined to hold her own there, that less pushing States are disconcerted. They wonder how much farther she is to go, and that all-important question must depend on the resources she has in reserve.

It is possible to take two opposite views of the financial future of the German Empire, and both of them may be substantially correct. Its natural resources are enormous, and they are now being systematically developed. On the other hand it is equally evident that they are being heavily mortgaged. It may surprise most readers to learn that between Imperial loans, State loans and commercial loans the public debt of Germany exceeds that of the United Kingdom. In this matter, if in no other, the Germans have overtaken us, and if their present rate of borrowing be kept up they will soon be well ahead of us. Mr. Heyman's summary of German indebtedness runs into sensational figures.

First he states the sum total of Imperial loans outstanding at 4,996 million marks (249,800,000*l.*). Secondly, he calculates the aggregate of State loans at the same date (October, 1910) to have been 15,000 million marks (750,000,000*l.*) and the communal debts at 5,408 millions (270,400,000*l.*). This gives us a grand total of 1,270 millions sterling, a figure which should reconcile us to our own 1,254 millions of combined national and local indebtedness. The British national debt will be about 760 millions sterling when the Chancellor of the Exchequer has to deal with it in his next Budget. The latest available returns of municipal and other local debts showed an aggregate of 494 millions; consequently we are still a few millions under Germany. In Mr. Heyman's book the economic student will find a mass of interesting details on these and other kindred subjects. W.R.L.

8.—*La politique budgétaire en Europe: les tendances actuelles.* Conférences organisées à la Société des anciens élèves de l'École libre des Sciences politiques. xxiv + 316 pp. Paris: Félix Alcan, 1910. Price 3 fr. 50 c.

During recent years most of the important States of the world have found themselves compelled to reconsider their revenue systems and methods of financial administration, in order to cope with the heavy increases of expenditure resulting partly from war (as in Russia and Japan) or the preparation for war, and partly from the growing demand for further State action in respect of such matters as education and social reform. The coincidence that financial legislation was the dominant interest of British and German domestic politics in 1909 induced the Société des Sciences Politiques to organise the course of lectures contained in the present volume. The course consisted of four lectures delivered by various authorities on the financial systems and recent policy of the United Kingdom, the German Empire, Russia and Turkey; and these are followed by an essay in which M. Raphaël Georges-Lévy examines the salient features of the latest budgets of the four countries named, in comparison with that of France, and endeavours to derive some practical conclusions from the study. The contributions of the chairmen at the various lectures are interesting as statements of the impressions of distinguished non-experts.

The lectures, which are all valuable, vary greatly in character and scope, as was to be expected in view of the diversity of the financial systems to which they relate. The lengthiest and most statistical is that upon Russia, by M. A. Raffalovich; it may, perhaps, best be described as a eulogy upon Russian financial administration —praise which is certainly merited so far as the conduct of the debt is concerned, and an optimistic survey of the economic conditions and prospects of that Empire, which has, indeed, shown unexpected recuperative power. M. Raffalovich's optimism was doubtless in this instance particularly welcome to a French audience; but each of his fellow lecturers seems to have approached his own particular subject in the same spirit. M. Picot's lecture on the United Kingdom has especial reference to the 1909 Budget, and is largely concerned with the personality of Mr. Lloyd-George. Whilst offering some criticisms of the Chancellor's economics, M. Picot is strongly of opinion that there is nothing revolutionary in his actual policy, which is in fact regarded only as the elaboration, to meet increased needs, of a long-established and generally accepted scheme of national finance. Incidentally, M. Picot (as M. Georges-Lévy later) pays a tribute to the British dealings with the National Debt, always a matter of admiration to continental financiers. M. Henri Gans, dealing with the German Empire, lays stress upon the extraordinary errors of German financial policy since 1871—particularly in regard to the matricular contributions, and the complications carried in their train, the piling-up of debt, and the neglect of a sinking fund; he points to the inelasticity of a revenue system mainly restricted to indirect taxation; he regrets the extent to which the protective system has been carried under agrarian influence (regarding it as handicapping industry) and the attitude of the agrarians towards the Imperial Government's scheme of financial reform. But he has, quite properly, full confidence in Germany's ability to bear with ease, under a better system, a much heavier burden of taxation than is at present laid upon her. Finally, M. Charles Laurent, whose lecture is devoted chiefly to an account of the reform of financial administration in Turkey (a work in which he himself has taken a distinguished share), manages to take a cheerful view even of the prospects of that Empire. This is not easy, in face of recurring heavy deficits (that for 1911-12 will be at least 10 millions sterling), the result of the mingled venality and incompetence of the previous régime; but M. Laurent, realising that an increase of direct taxation would be inadvisable in the case of a population so predominantly agricultural and poor as is that of Turkey, yet looks for an enlarged revenue to the better collection of existing taxes, notably the customs, to the advance of the customs duties by a further 4 per cent. *ad valorem*, and to new excises on tobacco, petroleum, &c., when the consent of the Powers has been obtained.

It is left for M. Raphaël Georges-Lévy to be severely critical and somewhat pessimistic. His essay, with the summarised budgets which it offers, is of considerable value, but it suffers from the defects of its materials. No real comparison between the five budgets is possible; they do not relate to similar State conditions. Doubtless comparison can properly be made between the budgets of the United Kingdom and France, but it cannot be so made between their budgets and that of the German Empire, which is a federal budget and omits, therefore, on both its revenue and expenditure sides, items which perforce appear in the other two (both M. Gans and M. Georges-Lévy pay scant attention to the German State budgets); and whatever may be said of Russia, the financial problems of Turkey are not in the same category with those of the Western States. Nevertheless, M. Georges-Lévy contrives to draw some morals for his countrymen, and to offer some suggestive general conclusions and criticisms. Whilst his obvious doubts as to State systems of social insurance, his hostility to the State ownership of industrial enterprises (with its criticism of the financial results of the Russian Imperial railways and its contention that the financial results of State productive monopolies could generally be better attained by an excise on the article monopolised), and his remarks as to the uneconomic character of the ever-increasing expenditure upon armaments, present little that is new, they serve as a useful corrective to the more optimistic views of his colleagues. P.A.

9.—*Direkte Staats- und Gemeindesteuern in der Schweiz:* die heutige Belastung physischer Personen durch direkte Staats- und Gemeindesteuern in der Schweiz, mit besonderer Berücksichtigung der Progression, von Peter Hans Weiler. viii + 260 and 118 pp. Zurich: Art. Institut Orell Füssli, 1910. Price 8 fr.

The nature and purpose of this work, by a German investigator, are sufficiently indicated by its title. It is a very elaborate examination of the extent to which the principle of the progressive taxation of property or income has been adopted in the 25 (or, counting the federal, 26) tax systems of Switzerland, and the methods by which it has been carried out in practice. As it has been adopted in most of the cantons for both cantonal and communal taxation, and as the forms employed in the various cantons differ greatly one from another, the intensity of the enquiry is altogether disproportionate to its geographical extent. After a brief theoretical introduction and a short sketch of the historical development of progressive taxation in Switzerland, Dr. Weiler proceeds to analyse the systems in force, in order to arrive at some general types, and with special regard to the burdens imposed upon the smaller taxpayers. In the second part of the volume (199 pp.), the methods utilised in each of the cantons are described and criticised in detail, the cantons being grouped according as they have (i) proportionate tax systems and (*a*) actually proportional taxation or (*b*) actual progressive taxation; (ii) progressive cantonal taxes and proportional communal taxes; (iii) progressive cantonal taxes and partially progressive communal taxes; and (iv) progressive cantonal *and* communal taxes. Then follow an appendix containing 36 pages of extracts from the various cantonal laws dealing with this method of taxation; 79 pages of tables showing the rates at which the small, middle-class and large taxpayers are taxed for cantonal and communal purposes in each canton; and three pages of bibliography.

The information contained in Dr. Weiler's work is thus very comprehensive and minute—its acquisition has evidently involved much labour and research; it will be of great interest to the student of the technique of taxation, but the book is, perhaps inevitably, too technical to appeal to any except a certain few. P.A.

10.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Avenel (*Vte. Georges D'*). Découvertes d'Histoire sociale, 1200-1910. 334 pp., 8vo. Paris: Ernest Flammarion, 1911. Price 3 fr. 50 c.

[An interesting and readable account of social conditions in France during the past 700 years. Prices of various commodities and wages during this period have been the basis of the author's researches, and they have revealed many unexpected results.]

Bentwich (*Norman*). The Declaration of London, with an introduction and notes and appendices. 175 pp., 8vo. London: Effingham Wilson, 1911. Price 5*s.* net.

[The author's object is to explain the contents of the Declaration of London as a whole and in detail, and to correct some erroneous opinions as to the changes which it would introduce into our prize law.]

Chiozza-Money (*L. G.*). Riches and Poverty (1910). Tenth and Revised Edition. xxiv + 355 pp., 8vo. 1911. London: Methuen and Co. Price 5*s.* net.

[The author in this edition revises his earlier estimates as to the distribution of wealth, the inequalities of which, he considers, have increased, owing to the stationary character of wages and the increased cost of living.]

Fox (*W. H.*). The Company-Secretary, containing a full description of the duties of the Company-Secretary, with an appendix of Forms and precedents, including those under the Companies (Consolidation) Act, 1908. Sixth Edition. 460 pp., fol. 1911. London: Gee and Co. Price 25*s.* net.

[A useful compilation of information as to the formation, carrying on and voluntary liquidation of joint stock companies.]

Harms (*Dr. Bernhard*) Das Staatswissenschaftliche Institut an der Universität Kiel. Unter besonderer Berucksichtigung seiner "Abteilung für Seeverkehr und Weltwirtschaft." 31 pp., 8vo. Jena, 1911. Gustav Fischer.

[An address at the opening of the section for shipping and trade of the Institute of Political Science of the University of Kiel.]

Herbert (*Edward G.*). New Æra: a socialist romance. 212 pp., 8vo. London: P. S. King and Son, 1911. Price 1*s.* net.

Heyman (*Hugo*). Die Deutschen Anleihen. 278 pp., 8vo. Berlin: Puttkammer and Mühlbrecht, 1911. Price 5 m. 40 pf.

Howells (*Clarence S.*). Transport facilities in the mining and industrial districts of South Wales and Monmouthshire, their history and future development. 56 pp., la. 8vo. London: P. S. King and Son, 1911. Price 2*s.* net.

[The author's object is to trace the development of transport facilities in South Wales, and of the industries which have led to this development; and he considers whether economies can be effected under the present conditions of working. The period covered by this study extends from 1790 to 1909, and there are many tables illustrative of the subject under review.]

Jacob (*L.*). Le Calcul mécanique. Appareils arithmétiques et algébriques intégrateurs. xvi + 412 pp., 8vo. Paris: O. Doin et Fils, 1911. Price 5 fr.

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* See also "Additions to the Library," page 571, *sqq.*

Lesigne (*Ernest*). Les droits du travail. L'homme ne veut plus du salariat. xx + 242 pp., sm. 8vo. Paris: Marcel Rivière et Cie., 1911. Price 3 fr.

[A statement from the socialist point of view of the present economic condition of the working classes in France and other countries. The author, in a second volume, intends to describe the organisations that are to be called into existence to remedy the present state of affairs.]

Levasseur (*Emile*). Les Colonies sous le Règne de Louis XIV. 12 pp., 8vo. Felix Alcan. Paris, 1911.

[A short account of the extent and resources of French Colonial possessions during the reign of Louis XIV.]

——— Les Grandes Compagnies de Commerce sous le Règne de Louis XIV. 24 pp., 8vo. Felix Alcan. Paris, 1911.

[A short historical account of the organisation and working of the great commercial companies founded in England, Holland and France to trade in the East and West Indies, and of their rivalries and ultimate fate.]

Levy (*Raphael Georges*). Banques d'émission et Trésors publics. xxiv + 628 pp., 8vo. Paris: Hachette et Cie, 1911.

Lottin (*Joseph*). Les régularités statistiques. Un chapitre de la logique inductive. 87 pp., 8vo. Louvain, 1911.

Maury (*Francois*). Le Port de Paris. Ouvrage couronné par l'Institut. Troisième Édition Entièrement Refondue. viii + 307 pp., sm. 8vo. Paris: Felix Alcan, 1911. Price 3 fr. 50 c.

[This book, first issued about eight years ago, gives a short historical account of the Port of Paris, of its present position, and of future requirements. There are tables showing the trade of the port from 1818 to date.]

Mayr (*Dr. Georg V.*). Forschungsgebiet und Forschungsziel der Kriminalstatistik. Pp. 33-64, 8vo. 1911.

Michel (*Edmond*). Études statistiques économiques, sociales, financières et agricoles. Les habitants, démographie, salaires, corporations et syndicats, assistance, mutualité, épargne, prévoyance, impôts. La. 8vo. Paris: Berger, Levrault et Cie., 1910. Price 13 fr.

Seligman (*Prof. E. R. A.*). The Income Tax: a study of the history, theory, and practice of income taxation at home and abroad. xi + 711 pp., 8vo. New York: Macmillan and Co., 1911. Price 12*s.* 6*d.* net.

[An exhaustive study of the history and present working of the income tax in different countries. The author's chief object has been to set the subject in a clearer light and to help legislators to frame a workable scheme in view of the likelihood of the early introduction of the tax into the United States.]

Sprague (*O. M. W.*). Banking Reform in the United States. A Series of proposals including a Central Bank of Limited Scope. 176 pp., 8vo. Cambridge, Massa.: The Publication Office, Harvard University, 1911.

[The author is opposed to the establishment of a central bank on the lines of such banks as exist in Europe and does not think it would prove a remedy for the "financial ills" of America. He suggests the strengthening of existing banks and the formation of a central bank of limited scope.]

Wood (*H. G.*). Personal Economy and Social Reform. An enquiry into the spending and earning of money. xii + 146 pp., sm. 8vo. London: The Student's Christian Movement, 1910. Price 1*s.* 6*d.*

[Issued for the use of social study circles and with the object of promoting discussion of "the present day duty of the Christian disciple in the matter of the spending and earning of money."]

Yule (*G. Udny*). An Introduction to the Theory of Statistics, with 53 figures and diagrams. xiii + 376 pp., 8vo. C. Griffin and Co., Ltd., 1911. Price 10*s.* 6*d.* net.

Russia. The Russian Year-Book for 1911. Compiled and edited by Howard P. Kennard, M.D. With an introduction by Baron Alphonse Heyking, Imperial Russian Consul-General, London. xv + 388 pp., 8vo. London: Eyre and Spottiswoode, Ltd., 1911. Price 10*s.* 6*d.* net.

[A useful epitome of Russian affairs. Such subjects as lend themselves to statistical treatment are illustrated by statistical tables well up to date. The book has a full index, but would gain by the addition of a table of contents in future editions.]

United States. Bulletin of American Economic Association. Fourth Series. No. 1. The American Economic Review. Vol. 1, No. 1. March, 1911. 8vo. 1911.

Reply to a communication from H. E. O. Molina, Minister of Agriculture of Mexico. The work of the International Institute of Agriculture. Price Fluctuations in the Staples: their influence on the welfare of the State. 7 pp., 8vo. 1910.

The International Institute of Agriculture and its Influence on Economic Welfare. Reply to some comments made by the Minister of Agriculture of France. 7 pp., 8vo. 1911.

Index to the Economic Journal. The Journal of the Royal Economic Society. Vols. 11—20. (1901-10 inclusive.) 108 pp., 8vo. 1911.

CURRENT NOTES.

The trade returns for the past month are again satisfactory. As compared with March, 1910, there is an increase of 435,075*l.*, or 0·7 per cent., in imports, and an increase of 6,472,354*l.*, or 18·8 per cent., in exports, the value for the month being the highest on record. Re-exports show an increase of 730,678*l.*, or 8·6 per cent. It must, however, be remembered, in making a comparison, that owing to the Easter holidays occurring earlier last year the month contained two working days more than March, 1910. The imports are also affected by the lower prices of grain, flour, and cotton. The figures for the twelve months ending March, 1911, are summarised in the subjoined tables:—

[000's omitted.]

Shipping (foreign trade).	Twelve months ending March, 1911.	Twelve months ending March, 1910.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	42,060,	40,460,	+ 1,600,
Total, British and foreign, *cleared* with cargoes	58,504,	56,882,	+ 1,622,

[000's omitted.]

Imports.	Twelve months ending March, 1911.	Twelve months ending March, 1910.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	254,132,	258,984,	− 4,852,
II. Raw materials and articles mainly unmanufactured	274,264,	221,405,	+ 52,859,
III. Articles wholly or mainly manufactured............................	159,605,	150,915,	+ 8,690,
IV. Miscellaneous and unclassified (including parcel post) ...	2,555,	2,608,	− 53,
Total merchandise........	690,556,	633,912,	+ 56,644,
Imports of bullion and specie	72,320,	61,866,	+ 10,454,

[000's omitted.]

Exports.	Twelve months ending March, 1911.	Twelve months ending March, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	27,193,	23,681,	+ 3,512,
II. Raw materials and articles mainly unmanufactured	54,198,	51,818,	+ 2,380,
III. Articles wholly or mainly manufactured	354,170,	308,045,	+ 46,125,
IV. Miscellaneous and unclassified (including parcel post)	8,390,	6,790,	+ 1,600,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,381,	11,843,	+ 1,538,
II. Raw materials and articles mainly unmanufactured	62,961,	58,288,	+ 4,673,
III. Articles wholly or mainly manufactured	28,265,	24,993,	+ 3,272,
IV. Miscellaneous and unclassified (including parcel post)	204,	296,	− 92,
Total, British, foreign and colonial	548,762,	485,754,	+ 63,008,
Exports of bullion and specie	61,637,	62,680,	− 1,043,

Mr. Sauerbeck's index number of prices for March is 78·9, as against 78·6 in February, the average of the eleven years 1867-77 being taken as 100. This slight rise is due principally to articles of food, and amongst these too a rise for potatoes, rice and sugar. In the aggregate materials showed no change. Iron remained weak and prices showed a further slight reduction, being at the end of March about 5 per cent. cheaper than in December. Copper was also flat, but tin remained on a high level. Cotton and flax were unchanged, but wool and jute were somewhat higher. Tallow, palm oil and linseed were a little lower. Articles of food were 72·6, as compared with 72·0 in February, materials were again 83·5, and silver also showed no change. The *Economist* index number stands at the same figure as a month ago, viz., 2,536.

According to the Board of Trade *Labour Gazette* the state of the labour market during February, 1911, was as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
February, 1911	398	757,430	25,030	3·3
January, 1911	403	753,040	29,239	3·9
February, 1910	416	701,252	40,121	5·7

Employment generally improved in February, and was much better than a year ago. The shipbuilding and engineering industries continued to improve, and are now well employed. The improvement in February, as compared with a year ago, was especially marked in the iron and steel, tinplate, engineering, shipbuilding, cotton, glass, furnishing, and woodworking trades. There was little change in coal and iron mining, and there was a decline in the jute and lace trades.

Part i of the "Agricultural Statistics for 1910" [Cd-5585, price 5½*d*.], containing the returns of the acreage of crops and the number of live stock in Great Britain, as collected in June last, has been issued by the Board of Agriculture. The completion of the first decade of the twentieth century, as is pointed out by Mr. Rew in his prefatory report, affords an opportunity for reviewing briefly the changes which have recently occurred in agriculture, so far as they are revealed in the annual statistics. Comparing the average for the last decade of the nineteenth century with the average for the first decade of the twentieth, the more salient changes have taken place in the area under small fruit, which has increased by 11,000 acres, or 16 per cent.; in orchards, which have increased by 25,000 acres, or 11·5 per cent.; and in the area under wheat, which has fallen by 248,000 acres, or nearly 13 per cent. As regards live stock, the numbers of horses, cows and heifers, and all cattle show small percentage increases, those of sheep and pigs slight falls. These comparisons of decennial averages give a general view of the relative position in the two decades, but an examination of the detailed tables shows that the movement in most cases has been by no means regular; the most consistent movements have taken place in the reduction of arable land and in the increase of acreage under fruit. The increase in the number of cows and heifers has been relatively greater than the increase in cattle generally, but this is largely due to the serious reductions in 1893-95 and the steady annual additions during the last decade. In proportion to population the numbers are markedly less than they were twenty years ago; in 1891 there were 80 cows and heifers in milk or in calf for every 1,000 of population in Great Britain, in 1910 as nearly as can be calculated only 67. The figures suggest that the time is approaching when the milking herd of the country may be inadequate for the milk supply of the people, unless the stock of cows is augmented from year to year as the demand increases.

The total number of horses used for agriculture, including mares kept for breeding and unbroken horses, returned in 1910 was

1,545,376, a decrease of 7,617 since 1909. This decrease was mainly due to a drop of over 12,000 in the class of unbroken horses aged one year and above. The number of unbroken horses under one year, which affords the nearest available index to the extent of horse breeding from year to year, shows no signs of recovery from the sharp fall of 1906-07, the number returned, viz., 126,180, being the lowest yet recorded. Within six years the annual supply of British-bred horses has been reduced by 13,000 per annum, while the total stock of horses on the farms of this country has been depleted by about 27,000. Turning to the data respecting agricultural holdings, it is noted that the reduction in the number of the larger farms, *i.e.*, those over 300 acres, which has been generally apparent in recent years, was again evident in 1910. Within the last twenty-five years 1,795 of such holdings have disappeared, and of these 349 have gone since 1905. The passing of the Small Holdings and Allotments Act of 1907 lends special interest to the figures relating to holdings of under 50 acres in England and Wales. During the two years 1908 to 1910 the net addition of such small holdings was 1,626. This represents a striking change in the previous tendency, the numbers of small holdings having diminished by 3,495 from 1903 to 1908. The number of small holdings provided under the Act in 1908 and 1909, according to particulars furnished by the local authorities, was 4,443; but the creation of small holdings in one district may, it must be remembered, be accompanied by an absorption in another, *e.g.*, for building purposes. It may be mentioned that among the smaller crops not separately distinguished in the tables is sugar beet, which in 1909 occupied only 51 acres. In 1910 the total area planted was 506 acres, mainly in Essex, Norfolk and Suffolk.

The *Economic Journal* for March contains a forecast of the Census results which two students of statistics have worked out from the recorded births and deaths and the Board of Trade returns of emigrants and immigrants. The United Kingdom is put at 45,052,000, England and Wales at 35,914,000, Scotland at 4,764,000 and Ireland at 4,374,000. These figures give England more than half a million fewer inhabitants and Scotland 200,000 fewer than the so-called "official estimates," which are based on the previous intercensal increase and do not profess to take into account the records of migration. The recorded net emigration from the United Kingdom has been very much greater in the last ten years than 1891-1901, which accounts for the discrepancy. The distribution of the loss by migration between the three kingdoms is based partly on the Irish "permanent emigration" figures published by the

Registrar-General for Ireland and partly on inferences from what has happened in previous decades, and a consideration of the numbers of English, Scotch and Irish in the Board of Trade migration returns.

The second number of *Paludism* (the Transactions of the Committee for the Study of Malaria in India) contains, amongst other articles, a note by Major S. R. Christophers, I.M.S., on epidemic malaria of the Punjab and a method of predicting epidemic years. For the years 1868 to 1908 the number of fever deaths in October and November shows a correlation of 0·67 with the monsoon rainfall. If, for reasons not given in the present note, but promised in a full report now in the press, the rainfall be multiplied by a factor representing an index number of wheat prices, the correlation is raised to 0·80. But, further, it has been remarked that epidemics seem particularly likely to appear in a year of heavy, following a year of deficient, rainfall. The effect was therefore tried of multiplying the product rainfall × prices by the ratio of the rainfall for the given year to the rainfall of the year before. Correlating the numbers so calculated with the fever deaths the coefficient was 0·83. The index arrived at in this way picks out remarkably well some of the heavier epidemic years, *e.g.*, 1900 and 1908. In 1876, on the other hand, when the actual deaths totalled 174,000, the deaths estimated from the index would only have been 68,000, the rainfall and its ratio to that of the preceding year being both moderate and prices low. It is not shown, it may be remarked, that the product is the best function of the three factors chosen from which to estimate the deaths; it is possible that a linear function of the three, determined by the ordinary theory of multiple correlation, might give slightly better results.

The February issue of the *Yale Review* contains the announcement that the copyright and goodwill of the magazine have been transferred to the Yale Publishing Association, who will continue the publication as a general review and issue the first number of the new series next October. The present number is, accordingly, the last one issued, under the management of professors of political science and history at Yale University, " for the scientific discussion of economic, " political, and social questions." The reasons for making the change at the present time are given. As was stated in the March issue of the JOURNAL, the American Economic Association is now issuing the *American Economic Review*, in place of the *Economic Bulletin*, and this will cover practically the whole field hitherto covered by the *Yale Review*. As this review will be the only one of its kind in the United

States officially representing economists as a body, the Editors of the *Yale Review* have decided to merge their interests in the larger movement, as they did in 1896, when the *American Historical Review* was established and history was dropped from the programme of the *Yale Review.*

This issue of the *Yale Review* contains the conclusion of an article by Mr. Julius H. Parmelee on "The Statistical Work of the Federal "Government," the first part of which was referred to in the JOURNAL for December, 1910 (page 141). The author continues the historical survey of the development of various departments and offers a number of criticisms and suggestions intended to bring about an improvement in official statistics, as regards promptness, accuracy, utility, simplicity, and "forcefulness." It is contended that these proposals can for the most part be adopted without legislative effort. The point emphasised is that statistical concentration has probably gone far enough, and that more intelligent co-operation between the various departments should lead to substantial progress.

M. Barriol contributes to the *Revue Économique Internationale* for December last an article on "La valeur sociale d'un individu," giving the results of some calculations to which he was stimulated by a table, in the *Almanach Hachette*, purporting to show the value of an individual at different ages. M. Barriol defines the social value of the individual as the sum that this individual will refund to the general stock by the expenditure of every sort arising from his personal earnings. Taking a typical case of a workman, he assumes that the man commences to expend from his own earnings 4*l.* per annum at age 13, his expenditure then rising to 72*l.* per annum at age 31 and remaining at the same level up to age 51, after which the earned expenditure gradually falls to 20*l.* per annum at age 65 and 16*l.* in later years—these latter sums not necessarily representing direct earnings but possibly savings, or income from savings. On these assumptions, allowing interest at 3 per cent., and taking of course the French life-table, the average value of the individual at birth, *i.e.*, the present value of his earnings, is approximately 674*l.*, the value rising to a maximum of 1,400*l.* at age 25. For an engineer, on the other hand, who does not begin to earn till age 21 but whose income then rises to 1,000*l.* at age 39 and 1,120*l.* at age 45, the value at birth is approximately 6,400*l.*, and this rises to 20,000*l.* at age 36. It will be seen that M. Barriol makes no allowance or deduction for the expenditure on the maintenance of the individual, his definition taking into account only the positive earning capacity. Dr. Farr, of whose contribution to this subject M. Barriol is evidently unaware, was, we think, more correct in his definition—"The present value of "the person's probable future earnings, *minus* the necessary outgo "in realising those earnings, is the present value of that person's "services" (*Memorial Volume*, p. 532, JOURNAL, vol. xvi, p. 38). If the cost of "outgo" in realising the earnings is ignored, the social value of the individual, especially in the earlier years of life, is seriously overestimated.

The *Journal de la Société de Statistique de Paris* for March contains an article by M. Henry Bunle on the relation between the variations of economic indices and the movement of the marriage rate. Dealing first with the correlation between the secular movements in the marriage rate and the price of corn, M. Bunle cites Mr. Bowley's results ("Elements of Statistics"), showing that at some time between 1865 and 1875 the sign of the correlation changed from negative to positive. Analysing the figures by separate decades (a very short period on which to base a coefficient of correlation), M. Bunle concludes that the change took place somewhat sharply near 1870; prior to 1870 the marriage-rate fell when prices rose, after 1870 the marriage-rate and prices rose and fell together. In France the state of affairs has been somewhat similar, though the coefficient becomes only small, and not actually positive, during the recent period; for the years 1836-60 the correlation is $-0·61$, for 1876-1900, $-0·04$. Passing to the consideration of the correlation between fluctuations treated by the method devised by Mr. Hooker (JOURNAL, 1901), M. Bunle finds correlations of 0·32 with import prices of the same year, 0·42 with import prices of the year before; with foreign trade the correlation is greatest, viz. 0·41, for the data of the same year. These figures are much smaller than the corresponding correlations for England and Wales, and the difference does not appear to be due entirely to the more industrial character of this country; if the marriage-rates are extracted for certain of the industrial districts of France alone, the correlations remain lower than 0·5. The marriage-rate in France seems, in fact, to be less susceptible to economic fluctuations than the English rate.

The ordinary theory of correlation considers the fitting of lines or planes to systems of points in such a way as to make as small as possible the sum of the squares of the distances of those points from the fitted line or plane, measuring the distances parallel to a fixed direction. If one point in the line, or not more than two points in the plane, be given or fixed in advance, the problem of fitting is evidently altered. This is the problem considered by Mr. E. C. Snow in a paper "On restricted lines and planes of closest fit to "systems of points in any number of dimensions" in the *Philosophical Magazine* for March. The formulæ, as might be expected, bear a certain formal resemblance to those of the ordinary theory. Thus if X, Y, be the deviations of the values of two variables from any fixed origin, given as a point on the line, the slope of the line through that point which will make a minimum the sum of the distances of the points, measured parallel to the axis of Y, is $S(XY)/S(X^2)$: the ordinary theory may be regarded as fixing the arithmetic mean as the point through which the line is to pass. The arithmetical examples taken by Mr. Snow are drawn from physics, but the formulæ are likely to find application in a wider field.

We are informed that the Swedish Government have under consideration a proposal for the publication of an official statistical review, to be published monthly or quarterly, and to contain information, statistics and diagrams relating to trade, prices, discount rates, bankruptcies, employment, &c., so as to form a kind of "economic barometer" of the condition of the country.

Dr. R. Meyer has resigned his office as President of the Central Statistical Commission of Austria on his appointment as Minister of Finance. He is succeeded by Dr. Ernst Mischler, Professor of Statistics and Administrative Science at the University of Graz.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Accountant, 1911—

March 18—The promotion and accounts of a private limited company (*continued in issues of March* 25 *and April* 1, 1911): *Jenkinson* (*M. Webster*).

March 25—The Companies Acts. Their use and abuse: *Sloan* (*D. Norman*).

April 1—Law of partnership: *Beard* (*P. Leo*).

Accountants' Magazine. April, 1911—The duties of a secretary: *Brown* (*Richard*).

Bankers' Magazine. April, 1911—Progress of banking in Great Britain and Ireland during 1910. No. 3. Balance-sheets of banks in the United Kingdom. The case for re-conversion of Consols: *Gibson* (*A. H.*). Scotch bank inspections. Gold reserves.

Economic Journal. March, 1911—State invalidity insurance: *Brabrook* (*Sir E.*). Exchequer grants: *Williams* (*W. M. J.*). Land valuation and rating reform: *Stamp* (*J. C.*). Results of the measures taken in Hungary for the development of industry: *Hollan* (*A. de*). Social importance of banking: *Lavington* (*F.*). Some aspects of international wheat trade: *Hubback* (*J. H.*). Women and unemployment: *Tawney* (*J.*) Monopoly and differential prices: *Bickerdike* (*C. F.*). Monopoly and differential prices: *Edgeworth* (*Prof. F. Y.*). The census of 1911: *Burnett-Hurst* (*A. R.*) and *Horwitz* (*I.*). The economic legislation of 1910: *Wilson* (*B.*).

Financial Review of Reviews. April, 1911—The scandal of money-lending banks, and a proposed remedy: *Cassel* (*F.*). Don José Yves Limantour and the finances of Mexico: *Coutouly* (*G. de*). The present position of our national finance: *Watt* (*Henry A.*) and *Hynes* (*T.*). How the Continent finances its railways: *Gardony* (*Dr. N. de*).

Journal of the Board of Agriculture. March, 1911—The value of different crops as green manures: *Hall* (*A. D.*). Agricultural credit in Italy. State aid to agriculture in Norway.

Journal of the Institute of Bankers. April, 1911—Bills of lading as collateral security: *Wallace* (*George*). A method of recording branch bank statistics: *Lewis* (*E. M. E.*).

Journal of the Society of Comparative Legislation. New Series. No. 24. *March*, 1911—Town planning: *Willcocks* (*R. E.*). The legal interpretation of the constitution of the Commonwealth. Part 1: *Keith* (*A. B.*) The Indian Councils Act, 1909: *Ilbert* (*Sir C.*). Notes on the presumptions of death and survivorship in England and elsewhere: *Colyar* (*H. A. de*). The Hague Conference on Bills of Exchange: *Chalmers* (*Sir M.*). Notes on land taxation in England: *Shepheard* (*W. P. B.*). Merchant shipping legislation of the Empire: *Keith* (*A. B.*). Review of legislation, 1909 (British and foreign).

UNITED KINGDOM—*Contd.*

Surveyors' Institution. Transactions. Session 1910-11. *Vol.* 43. *Part* 8—Judicial and parliamentary decisions with regard to rights in underground water since 1907: *Graham* (*W. Vaux*) and *Bidder* (*Harold F.*).

United Empire. (*Royal Colonial Institution Journal.*) 1911—

February—The Imperial Department of Agriculture in the West Indies: *Morris* (*Sir Daniel*). The next Imperial Conference: *Hordern* (*L. H.*). Ceylon, the Malay States and Java compared as plantation and residential colonies. Part 1 (*continued in next issue, March,* 1911): *Ferguson* (*John*).

March—Industrial development of Canada: *Powell* (*T. Ellis*). Papua and the Papuans: *Jenkins* (*Hon. J. G.*).

UNITED STATES—

Annals of the American Academy of Political and Social Science. March, 1911—Contains a series of papers by different authors dealing with the public health movement. 1. The general problem. 2. Disease carriers—the control of causes. 3. Elimination of diseases—physical care of individuals.

Bankers' Magazine (*New York*). *March,* 1911—The legal relation between banker and depositor: *Brady* (*Charles A.*). Canadian banking and commerce: *Eckardt* (*H. M. P.*).

Journal of Political Economy. March, 1911—The New York cloakmakers' strike: *McPherson* (*J. B.*). The social economic classes of the population of the United States. I: *Hourwich* (*Isaac A.*). Refunding the foreign debt of Honduras: *MacClintock* (*S.*).

Political Science Quarterly. March, 1911—Barriers against British democracy: *Porritt* (*Edward*). "People's Rule" in Oregon: *Haynes* (*G. H.*). Federal incorporation: *Hudson* (*S. D. M.*). Stock watering: *Ripley* (*W. Z.*) The electric lighting system of Paris: *Holcombe* (*A. N.*).

FRANCE—

Bulletin de Statistique, Ministère des Finances. February, 1911—Les monnaies fabriquées à la monnaie de Paris et la circulation monétaire en 1910. Les opérations de la Banque de France en 1910. Le Mont-de-Piété de Paris.

Bulletin Mensuel, Ministère de l'Agriculture, 1911—

January—Rapport sur le développement des sociétés d'assurances mutuelles agricoles. Rapport sur le fonctionnement des caisses de crédit agricole mutuel et les résultats obtenus en 1909 (Fin). La production agricole de Turquie d'Europe.

February—Belgique. Exposé de la situation d'intérêt agricole pendant 1908.

FRANCE—*Contd.*

Journal des Economistes. March, 1911—Les "National Banks" américaines et le projet Aldrich: *Guyot* (*Yves*). La situation financière de la Hongrie: *Zawadowski* (*A.*). Les droits de succession: *Marc* (*A.*). Considérations sur le commerce extérieur de l'Italie en 1909: *Giretti* (*Edoardo*). L'impôt allemand sur la plus-value des immeubles: *Bellom* (*Maurice*). Revue de l'Académie des Sciences morales et politiques: *Lefort* (*J.*). Mouvement scientifique et industriel: *Bellet* (*D.*). Travaux des chambres de commerce: *Rouxel.* Mécomptes des services municipaux: *Macler* (*M.*). La coulisse de la rente devant le tribunal correctionnel de la Seine: *Tchernoff* (*I.*).

Journal de la Société de Statistique de Paris. March, 1911—Considérations statistiques sur les importations des fruits et légumes en Angleterre et dans les différents pays d'Europe: *Bernard* (*Jules*). Relation entre les variations des indices économiques et le mouvement des mariages: *Bunle* (*Henry*). Chronique de statistique judiciaire: *Yvernès* (*Maurice*).

La Réforme Sociale. March 16, 1911—La fonction sociale des caisses d'épargne: *Lepelletier* (*F.*). L'action sociale catholique dans le diocèse de Bergame (*suite et fin*): *Rivière* (*Louis*). Le mouvement syndical et la situation des ouvriers gemmeurs dans les Landes: *Ricard* (*J. H.*).

Revue d'Économique Politique. March-April, 1911—Les trois notions de la productivité et les revenus: *Aftalion* (*A.*). La journée de neuf heures dans les mines, et l'enquête belge sur la durée du travail dans les mines de houille: *Wandervelde.* Origine des syndicats ouvriers: *Dechesne* (*L.*). Chronique des questions ouvrières: *Lescure* (*Jean*).

GERMANY—

Jahrbücher für Nationalökonomie und Statistik (*Conrad's*). *March*, 1911—Ergebnisse der Brüsseler Weltausstellung: *Brodnitz* (*Georg*). Der Ausbau des Arbeitsnachweises: *Wolff* (*Hellmuth*). Die Beschlüsse der Reichstagskommission zur Vorberatung der Reichsversicherungsordnung: *Wagner* (*M.*). Stockholmer Wirtschaftsrechnungen: *Galle.* Die Aussichten und die Sicherung des deutschen Ausfuhrhandels: *Gehrke* (*Franz*).

Vierteljahrshefte zur Statistik des Deutschen Reiche. Heft 1, 1911—Anordnungen für die Reichsstatistik bis zum Schlusse des Jahres 1910. Krankenversicherung (1905 bis 1909). Erntestatistik für das Jahr 1910. Die Neubauten auf deutschen Privatwerften und auf ausländischen Werften für deutsche Rechnung 1898 bis 1910. Die Zählung der Kraftfahrzeuge am 1 Januar 1911. Zur amtlichen Kenntnis gelangte schädigende Ereignisse beim Verkehre mit Kraftfahrzeugen (1. Oktober 1909 bis 30. September 1910). Vergleichende Darstellung zwischen der Kraftfahrzeugbestands- und Unfallstatistik (1. Oktober 1909 bis 30. September 1910). Die Bestands- und Kapitaländerungen der deutschen Aktiengesellschaften und Kommanditgesellschaften auf Aktien 1910. Reichserbschaftssteuerstatistik 1909. Bevölkerung des Deutschen Reichs am 1. Dezember 1910.

GERMANY—*Contd.*

Zeitschrift für Sozialwissenschaft. Heft 3. 1911—Beiträge zur Geldtheorie. I: *Heyn* (*O.*). Die Wanderarbeit als weltwirtschaftliches Problem. II. (Schluss): *Sartorius Freiherr von Waltershausen* (*A.*). Die Preisbildung an der Wertpapierbörse: *Thorwart* (*F.*). Wirtschaft und Recht. III: *Voigt* (*A.*) Das Wirtschaftsjahr 1910 und die allgemeine Wirtschaftlage Anfang 1911. II. (Schluss): *Pohle* (*L.*).

Zeitschrift für die gesamte Versicherungs-Wissenschaft. Heft 2. *March*, 1911—Die Haftung des Versicherungsnehmers für Handlungen Dritter: *Josef* (*Dr.*). Unterlassene und verspätete Prämienzahlung: *Weil* (*Dr.*). Konzentrationsbestrebungen im deutschen privaten Versicherungswesen: *Moldenhauer* (*Dr.*). Die Fusion von Versicherungs-Gesellschaften in rechtlicher Beziehung: *Schellwien* (—). Die deutsche Steuergesetzgebung seit 1906 in ihrer Bedeutung für die Privatversicherung: *Wertheimer* (*Dr.*).

LIST OF ADDITIONS TO THE LIBRARY.

During the month ended April 7, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Argentine Republic—

Agricultural and pastoral census of the nation. Stock-breeding and agriculture in 1908. Vols. 1. Stock-breeding. 2. Agriculture. 3. Monographs. 3 vols., maps, 8vo. 1909. (The Consul-General for Argentina.)

Austria—

Bosnia and Herzegovina. Provisorische Ergebnisse der Volkszählung in Bosnien und der Hercegovina vom 10. October, 1910. 4to. 1911. (Major P. G. Craigie.)

France—

Census. Résultats Statistiques du Recensement général de la Population effectué le 4 Mars 1906. Tome 1. Deuxième Partie. Population présente totale. Population active et établissements. Tome 3. Population présente : régions de l'Ouest et du Midi. 2 vols., 4to. 1910. (The French Labour Department.)

Colonies. Statistiques des Finances des Colonies Françaises pour les Années 1900-09. 8vo. 1910. (The French Colonial Office.)

Germany—

Census. Die Bevölkerung des Deutschen Reichs nach der Volkszählung vom 1. Dezember 1910. (Vorläufige Ergebnisse.) 10 pp., fol. 1911. (The Imperial Statistical Bureau.)

Deutscher Verein für Versicherungs-Wissenschaft. Veröffentlichungen. Heft 23. Kritik des Entwurfs eines Versicherungsgesetzes für Angestellte. 8vo. Berlin, 1911. (The Association.)

Italy—

Turin. La Vita Amministrativa del Comune di Torino nel quinquennio 1903-08. Vol. 3. 8vo. 1910. (The Municipal Statistical Bureau.)

Luxemburg, Grand Duchy of—

Berufs und Gewerbezählung vom 12. Juni 1907. II Reihe. 3 Band. Land- und Fortswirtschaftliche Betriebsstatistik. 8vo. 1911. (Major P. G. Craigie.)

Mexico—

Census. Censo de las Capitales de los Estados. Censo de habitantes en los Estados Unidos Mexicanos, verificado el 27 de Octobre de 1910. Sheet, la. 4to. 1911. (The Director-General of Statistics.)

Norway—

Census. Aperçu préliminaire des résultats du recensement au 1 Décembre 1910 en Norvège. 14 pp., 8vo. 1911. (The Central Statistical Bureau.)

Elections. Élections en 1909 pour le "Storting." 8vo. 1910. (*Id.*)

Insurance. Statistique de l'Institution générale des assurances des batiments contre l'incendie pour 1905 à 1909. 8vo. 1910. (*Id.*)

(a) **Foreign Countries**—*Contd.*

Russia—

The Russian Year-book for 1911. Compiled and edited by Howard P. Kennard, M.D. With an introduction by Baron Alphonse Heyking, Imperial Russian Consul-General, London. Sm. 8vo. 1911. (Purchased.)

United States—

Minnesota. Industrial Accidents and Employers' Liability in Minnesota. Part 2 of Twelfth Biennial Report of State Bureau of Labour. 1909-10. 8vo. 1911. (The Commissioner of Labour.)

Wisconsin University Bulletins—

Nos. 211 and 342. Congressional history of railways in the United States, 1850 87. 2 vols., 8vo. 1908 and 1910. (The University.)

No. 343. The most-favoured-nation clause in commercial treaties, its function in theory and practice and its relation to tariff policies: *S. K. Hornbeck.* 8vo. 1910. (*Id.*)

No. 355. The Knights of St. Crispin, 1867-74. A study in the Industrial causes of Trade Unionism: *Don. D. Lescohier.* 8vo. 1910. (*Id.*)

Bulletin of American Economic Association. Fourth Series. No. 1. The American Economic Review. Vol. 1, No. 1. March, 1911. 8vo. 1911. (The Association.)

International—

The International Institute of Agriculture and its Influence on Economic Welfare. Reply to some comments made by the Minister of Agriculture of France. 7 pp., 8vo. 1911. (The Institute.)

—— Reply to a communication from H. E. O. Molina, Minister of Agriculture of Mexico. The work of the International Institute of Agriculture. Price Fluctuations in the Staples: their influence on the welfare of the State. 7 pp., 8vo. 1910. (*Id.*)

(c) **United Kingdom and its several Divisions.**

United Kingdom—

Canada. United States of America: Reciprocity arrangement. Proposed Customs Tariff. Reciprocity arrangement between the Dominion of Canada and the United States of America. [Cd-5537.] 1911. (Purchased.)

—— Papers relating to a Proposed Commercial Arrangement between Canada and the United States of America. [Cd-5512.] 1911. (*Id.*)

Coroners' Committee. 2nd Report of Departmental Committee . . . Part 3. Evidence and Appendices. [Cd-5492.] 1911. (*Id.*)

Electricity in Mines. Report of Departmental Committee. [Cd-5498.] 1911. (*Id.*)

—— Minutes of evidence taken before the Departmental Committee . . . with index to the evidence. [Cd-5533.] 1911. (*Id.*)

Employment of Children Act, 1903. Report on Bye-laws made in 1910 by the London County Council under the Act, 1903. By Stanley Owen Buckmaster. [Cd-5497.] 1911. (*Id.*)

Imperial Conference. Correspondence relating to the Imperial Conference, 1911. [Cd-5513.] Fol. 1911. (*Id.*)

Labour. Shop Hours Orders. Return of Closing Orders made by Local Authorities under the Shop Hours Act, 1904 . . . [Cd-5499.] Fol. 1911. (*Id.*)

Mines. 3rd Report of Royal Commission on Mines. [Cd-5561.] 1911. (The Commission.)

Poor. Royal Commission on Poor Laws and Relief of Distress. Appendix, Vol. xi. Miscellaneous. [Cd-5072.] 1911. (*Id.*)

Public General Acts, 10 Edward VII and 1 George V. 8vo. 1911. (Purchased.)

Railway Superannuation Funds. Minutes of evidence taken before the Committee . . . with appendices and index. [Cd-5484.] 1911. (*Id.*)

(c) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Religion. Royal Commission on Church of England and other Religious bodies in Wales and Monmouthshire. Vol. 1. Part 1. Report of the Commission. [Cd-5432—i.] 1910. (The Commission.)

—— Vols. 2, 3, 4. Minutes of Evidence. Books 1-3. Questions 1-48,615. [Cd-5433, 5434, 5435.] 1910-11. (*Id.*)

—— Vol. 5. Appendices to Minutes of Evidence. Church of England. [Cd-5436.] 1911. (*Id.*)

—— Vol. 7. Appendices to Minutes of Evidence. Nonconformists. [Cd-5438.] 1911. (*Id.*)

England and Wales—

Census of England and Wales, 1911. Copies of Schedule, Explanatory Notes on the Occupiers' Schedule for use of School Teachers and Memorandum to Enumerators on the subject of Occupations. (The Board of Education.)

London County Council. Report of Conference on Teaching of Geography in London Elementary Schools. 8vo. 1911. (The Council.)

Ireland—

Department of Agriculture and Technical Instruction. Report of Departmental Committee on Irish Flax-Growing Industry. [Cd-5502.] 1911. (Purchased.)

(d) Authors, &c.

Avenel (*Vte. Georges D'*). Découvertes d'Histoire Sociale 1200-1910. 334 pp., sm. 8vo. Paris, 1911. (Ernest Flammarion.)

Bentwich (*Norman*). The Declaration of London, with an introduction and notes and appendices. vii + 179 pp., 8vo. 1911. (Effingham Wilson.)

Chiozza-Money (*L. G.*). Riches and Poverty (1910). Tenth and Revised Edition. xxiv + 355 pp., 8vo. 1911. (Methuen and Co.)

De Necessariis Observantiis Scarrarii Diologus. Commonly called Dialogus de Scaccario by Richard, Son of Nigel Treasurer of England and Bishop of London. Edited by Arthur Hughes, C. G. Crump and C. Johnson. viii + 250 pp., 8vo. Oxford, 1902. (Purchased.)

Fox (*W. H.*). The Company-Secretary, containing a full description of the duties of the Company-Secretary, with an appendix of Forms and precedents including those under the Companies (Consolidation) Act, 1908. Sixth Edition. Fol. 1911. (Gee and Co.)

Harms (*Dr. Bernhard*). Das Staatswissenschaftliche Institut an der Universität Kiel. Unter besonderer Berucksichtigung seiner "Abteilung für Seeverkehr und Weltwirtschaft." 31 pp., 8vo. Kiel, 1911. (The Institute.)

Herbert (*Edward G.*). New Æra. A Socialist Romance. 212 pp., 8vo. 1911. (P. S. King and Son.)

Heyman (*Hugo*). Die Deutschen Anleihen. 278 pp., 8vo. Berlin, 1911. (Puttkammer and Mühlbrecht.)

Howells (*Clarence S.*). Transport facilities in the mining and industrial districts of South Wales and Monmouthshire, their history and future development. 56 pp., la. 8vo. 1911. (P. S. King and Son.)

Ibáñez (*Vicente Blasco*). Argentina y sus Grandezas. 768 pp., 4to. Madrid, 1910. (The Consul-General for Argentina.)

Jacob (*L.*). Le Calcul mécanique. Appareils arithmétiques et algébriques intégrateurs. xvi + 412 pp., 8vo. Paris, 1911. (O. Doin et Fils.)

Jacob (*S. M.*). On the correlations of areas of matured crops and the rainfall, and certain allied problems in agriculture and meteorology. (Memoirs of Asiatic Society of Bengal, Vol. ii, No. 10, pp. 347-429.) 4to. Calcutta, 1910. (The Author.)

Lesigne (*Ernest*). Les droits du travail. L'homme ne veut plus du salariat. xx + 242 pp., sm. 8vo. Paris, 1911. (Marcel Rivière et Cie.)

(d) **Authors, &c.**—*Contd.*

Levasseur (Emile)—

Les Colonies sous le Règne de Louis XIV. 12 pp., 8vo. Paris, 1911. (The Author.)

Les Grandes Compagnies de Commerce sous le Règne de Louis XIV. 24 pp., 8vo. Paris, 1911. (*Id.*)

Levy (Raphael Georges). Banques d'émission et Trésors publics. xxiv + 628 pp., 8vo. Paris, 1911. (Hachette et Cie.)

Lottin (Joseph). Les régularités statistiques. Un chapitre de la logique inductive. 87 pp., 8vo. Louvain, 1911. (The Author.)

Maury (François). Le Port de Paris. Ouvrage couronné par l'Institut. Troisième Édition Entièrement Refondue. viii + 307 pp., sm. 8vo. Paris, 1911. (Felix Alcan.)

Mayr (Dr. Georg V.). Forschungsgebiet und Forschungsziel der Kriminalstatistik. Pp. 33-64, 8vo. 1911. (The Author.)

Méliot (M. et A.). Dictionnaire financier international théorique et pratique. Guide financier pour tous les pays. 3^{e} edit. 8vo. Paris, 1910. (Purchased.)

Michel (Edmond). Etudes statistiques économiques, sociales, financières et agricoles. Les Habitants, Démographie, Salaires, Corporations et Syndicats, Assistance, Mutualité, Epargne, Prévoyance, Impôts. La. 8vo, Paris, 1910. (Purchased.)

Seligman (Prof. E. R. A.). The Income Tax, a Study of the History, Theory, and Practice of Income Taxation at Home and Abroad. xi + 711 pp., 8vo. 1911. (Macmillan and Co.)

Sprague (O. M. W.). Banking Reform in the United States. A Series of proposals including a Central Bank of Limited Scope. 176 pp., 8vo. 1911. (The Publication Office, Harvard University, Cambridge, Massa.)

Wood (H. G.). Personal Economy and Social Reform. An enquiry into the spending and earning of money. xii + 146 pp., sm. 8vo. 1910. (The Student's Christian Movement.)

Yule (G. Udny). An Introduction to the Theory of Statistics, with 53 figures and diagrams. xiii + 376 pp., 8vo. 1911. (C. Griffin and Co., Ltd.)

(e) **Societies, &c., British.**

Drapers' Company Research Memoirs. Biometric Series VI. A Monograph on Albinism in Man, by Karl Pearson, F.R.S., E. Nettleship, F.R.C.S., and C. H. Usher, M.B., &c. Text, Part I, and Atlas Part I. 2 vols., plates, 4to. 1911. (Dr. M. Greenwood.)

Index to the Economic Journal. The Journal of the Royal Economic Society. Volumes 11–20. (1901-1910 inclusive.) 108 pp., 8vo. 1911. (The Society.)

Vol. LXXIV.] [Part VI.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

MAY, 1911.

The APPLICATION *of the* METHOD *of* MULTIPLE CORRELATION *to the* ESTIMATION *of* POST-CENSAL POPULATIONS.*

By E. C. SNOW, M.A.,
Biometric Laboratory, University College, London.

[Read before the Royal Statistical Society, April 25, 1911, the President, the Right. Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.]

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* The term "*post-censal*" is used here to denote the estimation *after* a census. The term *inter-censal* is now applied to estimates made for a date between two completed censuses. The phraseology has the sanction of Dr. Stevenson (*vide* a paper referred to in the text).

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1. The population of any town or district is, in general, ascertained accurately only at a census, which in the United Kingdom is taken at intervals of ten years. For various purposes, however, it is necessary to have some idea of the number of inhabitants of a district at different times during the ten years subsequent to a census. Perhaps the most important of these purposes is the determination of death-rates. Accurate death-rates are a *sine quâ non* of sanitary progress. In a paper read before this Society, Mr. Humphreys has given an instance (Salford in 1890) in which the birth and death-rates based upon the estimated population were calculated at 28·8 and 22·4 respectively, but when the results of the census taken in the following year were made known these figures were altered to 35·6 and 27·6 respectively.* The death-rate for any district for which the estimated population is much in error will, of course, itself be subject to a proportional error. A number of such districts can be picked out from the tables at the end of the present paper. In the case of the Romford (189) registration district, as an extreme instance, the death-rate based upon the estimated population for 1901 was 24·01; actually it was only 16·02.

* "Results of the Recent Census and Estimates of Population in the "largest English Towns." By Noel A. Humphreys, Esq., I.S.O., *Journal*, vol. liv, 1896, p. 311, *et seq.*

Estimates of population are now also made the basis for the distribution of certain public funds in London. Under the Equalisation of Rates Act (1904), the Registrar-General is required to compute the population of each parish in the County of London on the sixth day of April in each year. By Parliamentary direction this has to be done from a knowledge of the total number of houses entered in the rate books in each parish, details of which are obtained from the borough councils. The Registrar-General also makes estimates for the London parishes—as well as for many towns in the country—by an entirely different method, and the two sets of results are shown together in the annual volumes of the "London Statistics." The results placed in this manner bring out clearly the difficulties underlying any disbursements of public money on the basis of estimates of population, and have directed public attention to the unsatisfactory character of the distribution.*

2. The defects inherent in all the methods of calculating population have long been recognised by the authorities, and have received considerable attention. It is hardly possible to glance through a single volume of the Journal of this Society without coming upon a lament at the inadequacy of the methods now in use and the apparent impossibility of improving upon those methods. In particular, the two authorities on census and population figures —Sir J. Athelstane Baines, C.S.I., and Mr. Noel A. Humphreys, I.S.O.†—have frequently pointed out the futility of expecting reliable estimates from any hypothesis which has yet been put forward.

The remedy proposed by all who have seriously considered the difficulties has been that of more frequent censuses. The Council of this Society has repeatedly urged upon the Government the desirability of quinquennial censuses, the additional ones being of a less comprehensive character than those at present made. The chief argument put forward has been the necessity for more exact knowledge of the numbers of the population. So far these efforts have met with much sympathy but no success, and we have still to be in doubt of our actual number over ten-year periods.

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* See a letter by Canon Horsley and a reply by the Chairman of the Local Government Committee, L.C.C., in the *Westminster Gazette*, October 4 and 7, 1910.

† In the discussion following a Paper by Mr. R. Price Williams (*Journal*, September, 1880, vol. xliii, pp. 462—508), Mr. Humphreys is reported to have said, "In England and Wales, and in the manufacturing towns especially, it "did not seem possible to invent a theory which would be applicable to a "number of towns. The only satisfactory remedy for this difficulty being "to hold censuses more frequently than once in ten years." Mr. Humphreys has spoken to the same effect in many subsequent discussions.

Intermediate censuses, however, will only mitigate and not remove the deficiencies caused by the want of accurate modes of computing population. Most methods proposed, or likely to be proposed, will give smaller errors when used over a period of five years than over one of ten years. Nevertheless these errors will exist, and can only be obviated entirely by annual censuses. When we have our quinquennial censuses, therefore, we shall still require to ascertain the population of districts during the five years following a census, and the method which is best over a ten-year period will most probably also be best over a five-year period.

3. The methods which have been proposed for the estimation of post-censal populations fall under one or other of two heads:—

(*a*) Those based on pure hypothesis and which take no account of any information which can be derived from the locality as to births, deaths, marriages or other statistics.

(*b*) Those based to some extent on hypothesis, but which also use some of the information which may be obtained from the district.

Under (*a*) come those methods which assume that the population of a district increases in arithmetical progression, or in geometrical progression, or any combination of these.

4. The chief of all these methods is that adopted by the Registrar-General. "By this method the populations of the "several parts of the country, such as counties, towns, &c., are "first calculated by arithmetical progression, and are then raised "so as to total to the population of England and Wales estimated "by geometrical progression."* This method merely consists in multiplying the figure which would be reached by simple arithmetical increase by a factor which is the same for all districts, and which is such that the sum of the estimates of the separate districts is equal to the estimate for the whole country. For dates more than five years from the last census this method often fails to give the population approximately correct. "Any assumption used for "estimating populations for counties, towns, districts, &c., at a date "so far removed (1908) from the last census must be faulty, but "the method described above (the official one) appears to be less "unsatisfactory than any other which suggests itself." (Annual

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* I am indebted to the Registrar-General for this exact account of the method used in his office. It gives a better idea of the mode of procedure than do the statements in the Annual Reports and Annual Summaries, *e.g.*, "The "provisional estimates for the several counties, towns, &c., are computed by "dividing the total population (estimated on the assumption that the rate of "increase which had prevailed at the last intercensal period has since been "maintained) among the several divisions of the country in proportions determined by their rate of increase in the last intercensal period."

Report, 1908, p. vi.) It is natural that the large errors given by this method should be emphasised, but at the same time it should be pointed out that in many cases the population estimated by the official method comes extremely close to the actual figure. Table A gives the distribution of the percentage errors derived by this method from the figures of 235 districts, 59 of these being London parishes for the census 1891, and the remainder registration districts for 1901. (The complete figures are given in the tables at the end of the paper.)

TABLE A.—*Distribution of errors by Registrar-General's method.*

0—1 per cent.	1—2 per cent.	2—3 per cent.	3—4 per cent.	4—5 per cent.	5—6 per cent.	6—7 per cent.	7—8 per cent.	8—9 per cent.
21	33	24	10	20	15	17	16	11
9—10 per cent.	10—11 per cent.	11—12 per cent.	12—13 per cent.	13—14 per cent.	14—15 per cent.	15—16 per cent.	16—17 per cent.	17—18 per cent.
10	10	4	4	4	4	1	5	4
18—19 per cent.	19—20 per cent.	20—21 per cent.	22—23 per cent.	24—25 per cent.	26—27 per cent.	27—28 per cent.	28—29 per cent.	
1	1	3	2	2	2	2	1	
29—30 per cent.	30—31 per cent.	31—32 per cent.	34—35 per cent.	36—37 per cent.	40—41 per cent.	44—45 per cent.	49—50 per cent.	
1	1	1	1	1	1	1	1	

The median of this distribution is at rather less than 6 per cent., so that roughly, within the limits of the probable error of random sampling, it is an even chance that the error of the estimate is greater or less than 6 per cent.

Under stable conditions the official hypothesis would be quite sufficient to determine the population with the necessary accuracy. It is the very rapidly growing districts, such as parts of the "outer ring" of London, South Wales, &c., or declining districts—the central portions of the cities and large towns—in which most of the large errors occur.*

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* Some rather startling statements are made in the report of the Medical Officer of Health of the London County Council (Sir Shirley F. Murphy) for 1909 as to the rapidly falling birth, marriage, and death rates in the administrative County of London during the past ten years. These rates, it should be remembered, are based upon the population estimated for a date eight years after the last census, and there is considerable evidence to support the view that the estimate is in excess of the actual population, and that the true rates are higher than those stated in the report.

5. An even simpler method coming under (*a*) is that used by the American authorities. It has been termed "the arithmetical method,"* and is based upon the assumption that the growth of population in any one year is one-tenth of the growth between the previous censuses. This has the merit of extreme simplicity, but nothing more. The previous method does approximate to the actual state in the case of a stable community, but the arithmetical method does not allow for the fact that the actual increase of such a community becomes greater as the population grows.

6. A modification of the Registrar-General's official method is that of Dr. Stevenson, in which the density of the population of the district is taken into account in addition to the rate of growth in the immediate past.† Dr. Stevenson used the method to compute the population of certain districts (the eastern and north-eastern suburbs of London) twenty years hence, but did not advocate it for short periods between censuses. The idea underlying the method is that the density of the population approaches asymptotically a limiting value which is ascertained by comparison with some similar and neighbouring district whose development is complete, or practically so. As the density increases the rate of increase of the population diminishes, this diminution being determined from the experience of the similar district of anterior growth. Those methods of computing population which assume that the growth between any two censuses is continued (arithmetically, geometrically or otherwise) until the next might with advantage be modified to allow for the factor of increasing density. It does not seem justifiable to assume that the population of a district should continue to increase at the same rate as in the previous decade when the density of the population has reached beyond a certain limit. In Mr. Humphreys' paper previously cited there is a table giving the rates of increase of the population of a number of large towns for each decade from 1801 to 1891. Many fluctuations are to be noticed in these rates but, on the whole, there is evident a distinct diminution in the rate of increase.

7. Another method coming under (*a*) is that due to Mr. Waters (70*th Annual Report of the Registrar-General*, 1907, pp. cxxxii—iv), which, I understand, is soon to supersede the one above described as the official method. This is based upon the two assumptions (i) that the population of any district at any date can be expressed as a linear function of the populations at the two previous censuses, (ii) that the sum of the estimates for the individual districts should

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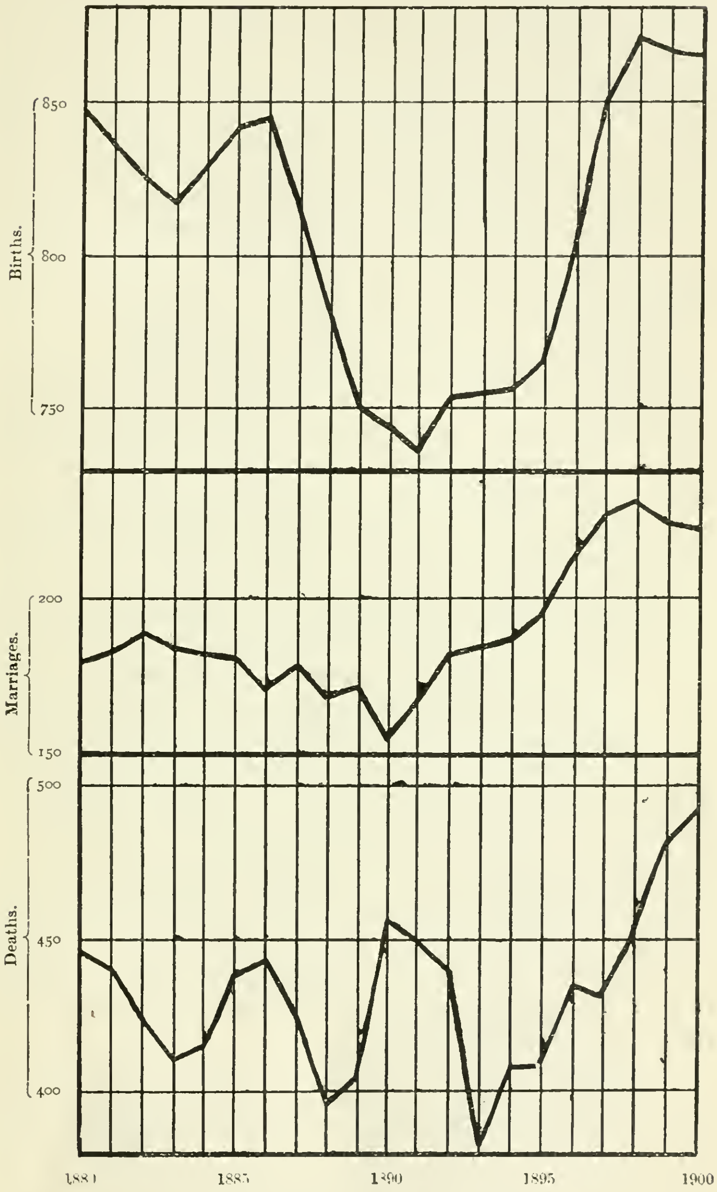
* *Bulletin* 71, Department of Commerce and Labour, Bureau of Census.

† An account of this method is given under the title "A method of estimating "future population," *Journal of Hygiene*, vol. iv, No. 2, April, 1904.

Births, marriages, and deaths in the Rugby district, 1880-1900.



be equal to the estimate for the whole country. It can easily be shown that the method may be reduced to the simple one of adding to the population at the last census a multiple of the increase in the previous intercensal period, which multiple is the same for all districts. When used in this form a scheme may be drawn up which enables us, knowing the results by the hypothesis of §4, at once to see if any improvement accrues from the use of the method of the present paragraph. Taking the 235 districts used in Table A, it will be found that Mr. Waters's method gives estimates closer to the actual population in 112 districts, but is inferior in 123 districts. It is a slight improvement, however, in the case of rapidly filling localities (see § 23, footnote). On the whole, the method seems to offer little advantage over that at present employed.

8. It has never been asserted that the assumption of uniform growth in the population of a district is justified. The assumption is made because it is said to be less unsatisfactory than any other which suggests itself. It does not seem possible to invent a better hypothesis which shall apply to every district of a country, and it is no doubt inconvenient to have a separate hypothesis for each district. In some districts, however, there is abundant evidence, apart from the census information, that the assumption has little justification. The diagrams show the course of the births, marriages, and deaths in the registration district of Rugby* from 1880 to 1900. It is clear that if there is any relationship whatever between population and births, marriages, and deaths, the movement of the first of these from 1891 to 1901 was quite different from that during 1881 to 1891. On the assumption that the movement was uniform, the error in the estimate was 22·4 per cent. The hypothesis applied generally, therefore, is unable to adapt itself to the facts, and may be obviously in contradiction to them.

9. Under (*b*) come those methods which attempt to make use of the number of births in a district during a given period, or the number of inhabited or rated houses at a particular time. The hypotheses here are that the birth-rate and the number of persons per inhabited house (referred to throughout the remainder of the paper as the "inhabited house rate") or rated house remain constant from one census to the next.

Treating first of the birth-rate. The hypothesis, at any rate since 1876, is quite unsound. Calculated on the mean population between censuses, the birth-rate in the whole of England and Wales fell from 32·34 per annum per 1,000 in the decade 1881-91 to 29·88 per 1,000 in 1891-1901, a decrease of 2·46 per 1,000. In certain districts the fall was much more; in others an actual increase was shown.*

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* There was a small alteration in the boundary of this district in the period mentioned, but this was too slight to affect the argument.

There are two possible ways of using the birth-rate to estimate population. In the first we find the birth-rate over a period of ten years between two censuses, using the mean population (calculated in some way) of that period. If we require the population at the end of *t* years after the second census we should assume that the annual birth-rate over the period of *t* years was the same as that of the previous ten. This would enable us to find the mean population during the *t* years, and hence that at the end of the period.

A defect in this method is that any error in the calculated mean population would cause a much greater error to arise in the population at the end of the period. The figures for a few districts have been worked out in this manner. As these, however, were nearly all greatly inferior to the results given by the previous methods they need not be shown.

The other way of using the birth-rate in this connection is to refer only to single years. The birth-rate in the census year can be accurately determined. Knowing the number of births in any other year, the population, on the hypothesis of a constant birth-rate, can then be found for the middle of that year. When the estimates made in this manner for a census year are ascertained they are found to agree with the actual census figures more closely than do those by the previous method. But the number of births in a district fluctuates considerably from year to year, so that the estimates for each of ten years found in this way would be very irregular. The error in that for the first year after a census might, therefore, be much greater than the error ten years after.

A possible improvement might accrue by calculating the population by the use of the birth-rate and by the marriage-rate separately. The mean of these might then be taken to be the true estimate. This process would be justifiable if the separate estimates did not greatly differ. In a number of examples worked out it is found that they do differ, in some cases considerably, though generally on either side of the true population.

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* A few cases taken from the Decennial Supplements are :—

Sheppey	30·84	to 25·05,	a fall of	5·79
St. Albans	31·18	,, 25·52	,,	5·66
Orsett	37·94	,, 31·87	,,	6·07
Maidstone............................	31·20	,, 25·61	,,	5·59
Barnsley	39·19	,, 40·89,	a rise of	1·70
Bedwellty............................	36·93	,, 38·91	,,	1·98
Pontypridd	38·44	,, 40·63	,,	2·19

In each case the district is the registration district of that name.

Another suggestion for the use of the birth-rate came from a speaker in the discussion following Mr. Humphreys's paper (*loc. cit.*). In this, the figures of natural increase and of emigration and immigration should be used to calculate a population on which to base the birth-rate of the whole country. It could then be assumed that the birth-rate in any particular district varied from its normal in the same direction and at the same rate as for the whole country. This assumption does not seem to be well-founded. The variation in the birth-rate of the whole country is the resultant of the variations in the different districts, and these are in either direction and of all sorts of magnitudes. The figures in the previous footnote indicate the relation between the variation in some of the districts to that of the whole country.

The birth-rate method of computing population seems to have been considered long ago, and to have been found wanting. It will not, therefore, be used for comparison with the new method to be described later.

10. The other method coming under (*b*) which has been used is the inhabited-house method. An inhabited house is to be distinguished from a rated house; and, as will be seen from the tables at the end, the use of statistics of the former leads to results far and away better than the other methods which have been tried. Unfortunately, however, information of the number of inhabited houses is not readily obtainable except at the census. The difficulties underlying the use of the number of inhabited houses as an index to population cannot be better stated than by quoting again from Mr. Humphreys's valuable paper: "It should be pointed out emphatically that an "inhabited house for census purposes is very far from being identical "with an inhabited house for rating purposes, and that therefore "any attempt to compare the census numbers of inhabited houses "with the numbers on the rate-books is absolutely useless and "misleading. If this fact, however, were fully recognised it is "impossible to doubt that the increase of inhabited houses on the "rate-books affords a most valuable indication of the growth of "population. On the other hand it has been urged, not without "good reason, that the rate-books as now kept do not yield "satisfactory information (1) on account of the large amount of "compounding for rates in respect of industrial dwellings and "tenement property, which interposes almost insuperable difficulties "in the way of ascertaining the number of inhabited houses at "any given date; and (2) because the number of persons per "house varies so considerably with commercial prosperity as it "affects wages among labouring classes." The method probably does not apply so well at the present time as in the past. In

a district which is rapidly changing its character the number of persons per house may also be changing. In these days of flats and garden-suburbs the relation between houses and population may be quite different from that only a decade ago. The results of the recent census will probably show some great changes in this respect. The districts in the eastern portion of London have shown some remarkable alterations in the past. For example, in the parish of Shadwell between 1881 and 1891 the number of inhabited houses decreased from 1,160 to 731, but the population only diminished from 8,170 to 8,123. Had the population been computed from the inhabited house data the result would have been 5,148, an error of 2,975, or nearly 58 per cent., if used for the determination of rates.* In two other London parishes (Horsley-down and St. Saviour's, Southwark) at the same time the errors would have exceeded 33 per cent. (See Table VII.)

In general, however, the figures of houses obtained from the rate-books will undoubtedly give more reliable data for the estimation of population than any other single item of information which can be ascertained from the district. The estimates found in this way for the purposes of the Equalisation of Rates Act for London parishes were on April 6, 1909 (see *London Statistics*, vol. xx, p. 40), smaller for most districts than those given by the Registrar-General's

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* This case seemed so remarkable that closer attention was given to it in order to see if the figures of births and deaths afforded any indication of the startling change suggested by the bare figures of the houses. Unfortunately the numbers of births and deaths for the parish itself could not be obtained; those of the registration sub-district of the same name were, therefore, tried. The registration area possessed 10,395 inhabitants in 1881, the parish having only 8,170. A lying-in hospital (marked *h*) was present from 1885 to 1889, but was not mentioned in the Annual Reports before or after that period. The figures by the side of the deaths give the number of those in institutions :—

Year.	Births.	Deaths.	Year.	Births.	Deaths,
1880	350	303—66	1887........	415*h*	464—228
'81........	337	356—134	'88	458*h*	422—224
'82	385	369—169	'89........	442*h*	441—245
'83	360	464—217			
'84........	388	461—224	1890........	318	543—286
'85........	402*h*	443—222	'91	328	456—272
'86........	425*h*	466—249	'92	327	477—281

A glance at these figures will show that there was no justification for the assumption of a large decrease in the population suggested by the figures of houses. A similar conclusion could be drawn from the corresponding figures in the cases of the other parishes mentioned. The inference is, that when the number of inhabited houses is used to estimate population, the numbers of births and deaths should also be referred to. If the estimate causes the birth- and death-rates to alter greatly, it is hardly likely to be approximately correct.

method, the total populations by the two methods being 4,719,800 and 4,833,900 respectively.

11. In each of the above methods, in which the number of births or of houses is used, the *actual* population is estimated and not the *increase* of the population from the previous census. Any method which attempts to estimate merely the *increase* of population possesses an advantage over those which aim at estimating directly the *actual* population. For since the *increase* generally bears only a small ratio to the *actual* population, a large error in the computation of the former may lead to a comparatively small one in the latter. Any reasonable method of estimating the *increase* of population should, therefore, be worth trying. But the idea cannot be applied directly. The first notion we have is as follows: in a certain period an increase of population p is accompanied by an increase of births measured over a previous period of b. If in the next period the increase of births measured over the preceding period is b', the increase of population will be (assuming the relationship between increase of population and increase of births to be constant) $p' = \frac{b'}{b}.p$. As is frequently the case, however, p may be positive and b negative, and then no conclusion can be drawn as to p'. There is one way out of this difficulty, and that is by the method of correlation. The idea is capable of extension, and the increase of population can be estimated in terms of any number of other variables. If more than one variable is employed, multiple correlation is the method to use.*

A brief résumé of the formulæ of multiple correlation will now be given, and the rest of the paper devoted to its mode of application to the estimation of post-censal populations, together with examples and results.

12. The theory of multiple correlation states that if $x_1, x_2 \ldots x_n$ are any variables in which the correlation of x_s with x_t can have any value between -1 and $+1$, and if x_0 is a variable correlated with $x_1, x_2 \ldots x_n$, then the most probable value of x_0 which can be expressed as a linear function of $x_1, x_2 \ldots x_n$, is given by

$$x_0 - \bar{x}_0 = -\frac{\Delta_{01}}{\Delta_{00}}\frac{\sigma_0}{\sigma_1}(x_1 - \bar{x}_1) \ldots - \frac{\Delta_{0s}}{\Delta_{00}}\frac{\sigma_0}{\sigma_s}(x_s - \bar{x}_s) \ldots$$
$$\ldots - \frac{\Delta_{0n}}{\Delta_{00}}\frac{\sigma_0}{\sigma_n}(x_n - \bar{x}_n)$$

where $\bar{x}_0, \bar{x}_1 \ldots \bar{x}_n, \sigma_0, \sigma_1 \ldots \sigma_n$ are the means and standard deviations respectively of the variables, and Δ_{0s} is the first minor of the constituent r_{0s} in the determinant

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* An account of the theory of multiple correlation is given by Mr. Yule in vol. lx, p. 812, of the *Journal* (1897). See also his paper "On the Theory of "Correlation for any number of variables, treated by a new system of notation," *Proc. R S.*, A, vol. lxxix (1907), p. 182, and his recently published text-book.

$$\Delta = \begin{vmatrix} 1 & r_{01} & r_{02} & \cdots & r_{0s} & \cdots & r_{0n} \\ r_{01} & 1 & r_{12} & \cdots & r_{1s} & \cdots & r_{1n} \\ \cdot & \cdot & & & \cdot & & \cdot \\ \cdot & \cdot & & & \cdot & & \cdot \\ \cdot & \cdot & & & \cdot & & \cdot \\ r_{0s} & r_{1s} & \cdots & \cdots & 1 & \cdots & r_{sn} \\ \cdot & \cdot & & & \cdot & & \cdot \\ \cdot & \cdot & & & \cdot & & \cdot \\ \cdot & \cdot & & & \cdot & & \cdot \\ r_{0n} & r_{1n} & \cdots & \cdots & r_{sn} & \cdots & 1 \end{vmatrix}$$

this minor being taken with a positive or negative sign according as s is even or odd.

In particular, if x_0 is expressed in terms of a single other variable,

$$x_0 - \bar{x}_0 = r_{01} \cdot \frac{\sigma_0}{\sigma_1}(x_1 - \bar{x}_1).$$

If two other variables are used,

$$x_0 - \bar{x}_0 = \frac{r_{02}r_{12} - r_{01}}{1 - r_{12}^2}\frac{\sigma_0}{\sigma_1}(x_1 - \bar{x}_1) + \frac{r_{01}r_{12} - r_{02}}{1 - r_{12}^2}\frac{\sigma_0}{\sigma_2}(x_2 - \bar{x}_2).$$

If more than two other variables are used, it is better to derive the formulæ in arithmetical form direct from the determinants.

13. The mode of procedure which can be adopted in the attempt to apply the method of multiple correlation to the estimation of post-censal populations is as follows:

For the variable x_0 some function of the population of a district —*e.g.*, the actual population, or the increase of that population measured from some particular census—can be taken. For the variables $x_1, x_2 \; . \; . \; . \; x_n$ can be taken functions of the births, marriages, deaths, inhabited houses or any other figures which are correlated with the population, *e.g.*, the actual number of births in a certain period preceding the census, or the excess of this number over that of a previous period. A formula can then be obtained, in the manner indicated above, expressing the most probable value of x_0 as a linear function of $x_1, x_2, \; . \; . \; . \; x_n$. Substituting for $x_1, x_2, \; . \; . \; . \; x_n$ the actual values for a particular district, we shall get the most likely value of x_0 obtainable from the distribution of the figures throughout the whole series of districts. This will not, except by pure chance, be the actual value of x_0 given by the district, but if the method is of any merit the computed should not differ greatly from the actual value.

After the census x_0 is not known, and its estimation is desired. But the values of $x_1, x_2 \ . \ . \ . \ x_n$ are known (or, at least for the purposes of the present paper, it is assumed that they can be obtained). Now the fundamental hypothesis on which the applicability of this method rests is, that if the actual value of x_0 could be found, and a formula constructed as before, this formula would not greatly differ from that found by the data of the earlier period for the same group of districts. (The justification for this assumption will be discussed when the results are commented upon later in the paper.) It follows that, on this hypothesis, the values of $x_1, x_2 \ . \ . \ . \ x_n$ may be used to give the most probable value of x_0 at any particular time after the census. The formula does not aspire to give the exact value of x_0, but it claims to give the *most probable* value of that variable which the past experience of a group of districts points to. If the correlations between x_0 and $x_1, x_2 \ . \ . \ . \ x_n$ are small, good results cannot be expected. If a considerable change occurs in those correlations subsequent to the period for which the formula was obtained, the results will again be poor. But on the assumption that past experience can be used as a guide for present inferences, and that a district does not greatly change its character as regards the relationships between the variables in a period of from ten to twenty years, the formula will enable us to obtain the most probable number for the population at any particular time which the data can give.

14. Since the results obtained by any means of estimating population can only (in general) be compared with the actual population at each census, it is superfluous, for the purpose of showing the suitability of the formulæ, to calculate the population at other times. Accordingly the data in the present investigation were arranged to estimate the population at the date of the census, and no reference will be made in the examples to the estimation at any time other than the census day. Some consideration has been given to the question of the arrangement of the figures for obtaining the population at other times, but it is unnecessary to describe here the methods suggested to that end.

15. The populations of the different districts deduced from the multiple correlation formulæ will be compared with those reached by the Registrar-General's method, and with those given by assuming the number of persons per inhabited house to remain constant from census to census. We may here speak of the means of comparison to be adopted. The actual error of any estimate can

be at once obtained on knowing the corresponding census population. Clearly, however, percentage errors only should be compared. In a group of a large number of districts it is improbable that the maximum error by one method, will occur in the same district as by another. It is idle, therefore, to say that the maximum error by one method is greater than that by another, for the actual populations on which the errors arise may be quite different. A percentage must thus be taken.

Moreover, that percentage should not be calculated on the actual population, but on the population given by the formula which is being considered. This is evident when we remember that the chief object of population estimates is to obtain death- (and other) rates.

In the rest of the paper the percentage error calculated in this manner will be referred to, for shortness, as "the error."

Three courses are now available in the comparison of the merits of the various methods.

(*a*) We may compare merely the largest errors given by each. This would be short and save considerable labour, but it would not give a satisfactory numerical criterion of the relative values of the methods.

(*b*) The mean of the errors of the whole group of districts, without regard to sign, might be taken. This would not entail great labour, but it would not give sufficient emphasis to the large errors. By this, a method which gave, say, ten errors of 20 per cent. and ten zero errors would be considered of equal merit with one giving all twenty errors of 10 per cent. But our object being to eliminate as far as possible the large errors, extra weight should be given to these when they occur.

(*c*) The procedure actually adopted was to use the "root mean square" of the errors. This involved extra work, but is the best way of giving the requisite weight to the larger errors. The numbers derived in this manner from the various formulæ will give a more reasonable criterion of the relative values of those formulæ than either (*a*) or (*b*).

16. Except in one case (Example III), the areas used in the examples were taken from the registration districts. Schedules with certain information of these districts had already been drawn up for another purpose from the valuable Decennial Supplements of the Registrar-General. From these latter the births, marriages and deaths in ten-year periods for each of the six hundred odd districts were extracted. The census populations of these districts, together with the information of the number of houses, were taken from the census reports. Where figures were required of the births, marriages and deaths for shorter periods, these were

obtained from the same districts from the various Annual Reports. There are, however, certain disadvantages in taking registration districts and in the use of the Decennial Supplements. The registration districts are not homogeneous, and many possess both an urban, or semi-urban, and a rural population, the relative sizes of these populations varying greatly, and are not to be detected from the crude figures. Thus it is difficult to arrange them in groups, such that each group consists of an aggregation of similar districts. Moreover, the figures of births, marriages and deaths given in the Decennial Supplement are for the ten years commencing on the first day of January in a census year. The census, however, is taken three months later, and thus the figures dealt with are not exactly those of the births, marriages, and deaths in the ten years between two censuses. This difference will not be taken into account. If the method gives good results on this rough material, even better results can be expected when more accurate figures are used. The present paper must be looked upon as giving an indication of the possibilities of the method, without aiming to show the limits of accuracy which may be reached when more perfect data are used.

17. In the following paragraphs the work carried out in the attempt to find satisfactory formulæ will be described. An outline will be given of an earlier example which did not lead to results much superior to those reached by the methods at present in vogue, while the later and more successful ones will be described in detail. It will be convenient here to denote the census of 1881 by (1), of 1891 by (2), and of 1901 by (3), while the ten-year period from January 1, 1871, to December 31, 1880, will be denoted by (0, 1), the corresponding period from 1881 to 1890 by (1, 2), and from 1891 to 1900 by (2, 3).

In each of the examples the object will be to estimate the increase of population during a post-censal interval, on the basis of the various available data, and then to compare the estimated population so found at the time of the final census with that actually observed.

To do this we may work out a formula expressing either the *actual* or the *percentage* increase of population in terms of other variables. If we use the percentage increase we should also require the percentage excesses of births, marriages and deaths (if the figures of these were employed) in a certain period over a previous one. This would entail much more arithmetical labour than is involved in taking the actual figures and not reducing to percentages. There is no reason to suppose that this extra work would lead to estimates much superior to those obtained without reducing to percentages.

Therefore, although a formula in which the variables were expressed in percentages might quite legitimately be used to calculate increase of population, only actual increases or decreases, not reduced to percentages, will be employed in the present paper.

18. The first attempt to employ the method was made on a group of the larger registration districts, most of them containing over 100,000 inhabitants. This group, 105 in all, included many of the London districts, the larger Lancashire and Yorkshire towns, and the big urban populations in other parts of the country. The variables used were—

Increase of population from (1) to (2)	x_0 or p
Births in period (1, 2)	x_1 ,, B
Deaths in period (1, 2)	x_2 ,, D
Increase of births in (1, 2) over (0, 1)	x_3 ,, b
,, deaths in (1, 2) over (0, 1)	x_4 ,, d
,, marriages in (1, 2) over (0, 1)	x_5 ,, m

Afterwards these 105 districts were subdivided and 51 of them were taken, each of which showed a positive increase of population between (1) and (2).

Consideration of space forbids the collection of the many statistical constants and correlations obtained in this example. Many interesting conclusions can be drawn from the figures. The chief of these is, that increase of population is correlated far less with the numbers of births, deaths and marriages than with the excess of these numbers over those of a previous period, a conclusion of great use for the later examples. Also the correlation between increase of population and natural increase (*i.e.*, births minus deaths) was much greater than between the former and either births or deaths separately.

A number of formulæ were worked out both for the 105 districts and the 51, in terms of two or more of the above variables. Some of these formulæ were tried on the data of the period (2, 3) to estimate the population at the census (3). The results obtained in this way were not greatly superior to those given by the present official method, and in themselves were not sufficiently good to justify an account of the method being published.

But many reasons could be put forward for the comparative failure in this case. The districts were chosen quite at random, and were probably as diverse a lot as it would be possible to obtain. The demographic rates varied among the districts between quite extreme values. The birth-rate ranged from 24 to 40, the (crude) death-rate from 18 to 33, and the marriage rate from 10 to 30. In these particularly unfavourable circumstances, it was hardly surprising that the results were but little better than those achieved by the old methods.

Attempts were made to modify the formulæ to take into account the fact that the birth and death rates were known to be falling throughout the period, at any rate in the country as a whole, though not in each individual district. A small improvement was manifest. Even then, however, some considerable errors were made in the various estimates. It was therefore decided to try more homogeneous data, and to postpone the consideration of the modification of the formulæ. The experience gained through the time spent on this problem, however, suggests that the modification of the formulæ to take into account the observed changing conditions as regards births and deaths is possible.

In the examples to be given in more detail below the districts were arranged in more or less homogeneous groups, and only the excesses of the births, deaths, &c., over those of a previous period used as variables.

19. *Example I.*—In this example a series of 103 registration districts was taken, each district of which contained, very roughly, between 20,000 and 50,000 inhabitants at the census of 1891. A number of districts otherwise suitable could not be included on account of alterations of boundaries which took place in the period under consideration. In cases where the alteration did not involve more than a small proportion of the population the change was neglected. This course is justified on the ground that no exact results are sought for, but merely a rough notion of the applicability or otherwise of the method, and because it is desirable to have as many observations as possible.

These 103 districts were divided into three groups, according as the increase of population in the decade 1881-91 was greater than 1,000, between + 1,000 and − 1,000, or less than − 1,000. In the first group there were 39 districts, in the second 42, and in the third 22. This last group was considered too small to deal with separately, and so the investigation was carried out on the following groups :—

A. 39 districts in which increase of population was $>1{,}000$
B. 42 ,, ,, $> -1{,}000$ and $<1{,}000$
C. 64 ,, ,, $<1{,}000$
D. The whole 103 districts.

The variables taken in this case were :—

Increase of population from (1) and (2)	x_0 or p
Births in (1, 2) − births in (0, 1)	x_1 ,, b
Marriages in (1, 2) − marriages in (0, 1)	x_2 ,, m
Deaths in (1, 2) − deaths in (0, 1)	x_3 ,, d

As before, the figures were worked out from those given by the

Supplements of the Registrar-General and the census reports.* In calculating the statistical constants it was inexpedient to adopt a large unit of grouping. On the other hand, the exact numbers of births, marriages and deaths possess no very great significance. It was sufficient, therefore, to take the numbers to the nearest ten. Thus in a district in which the variables x_0, x_1, x_2, x_3, had the values 5,865, 964, 265 and 547, they were taken at 586, 96, 26 and 55. The correlations were worked out from the figures obtained in this way by the product moment method, and with no grouping. The means, standard deviations and correlations are given below for each group, and are in terms of the actual unit, not the working one. Throughout the tables in the text the figures are given in round numbers, though when other results were to be derived from them greater exactness was used.

	A.	B.	C.	D.
$\bar{x}_0$	+ 4,040	+ 70	− 690	+ 1,130
$\bar{x}_1$	+ 520	− 410	− 730	− 250
$\bar{x}_2$	+ 180	− 70	− 110	0
$\bar{x}_3$	+ 40	− 310	− 460	− 270
σ_0	2,860	530	1,290	3,080
σ_1	860	500	740	990
σ_2	200	120	140	220
σ_3	420	250	390	470
r_{01}	·946	·532	·730	·881
r_{02}	·928	·539	·593	·888
r_{03}	·926	·484	·711	·836
r_{12}	·762	·390	·518	·775
r_{13}	·861	·729	·803	·872
r_{23}	·744	·215	·309	·673

It will be noticed from these figures that the districts in each group vary considerably in character. The correlations between increase of population and the increases of births, marriages and deaths are all greatest in group A—the group containing the districts in which the population was expanding, in some cases very rapidly. These correlations are much smaller for the comparatively stationary group (B), but when the decreasing districts are included the correlations are larger. Thus, judged from the data of these 103 districts, excess (or defect) of births, marriages and deaths over the previous decade is a better criterion of change of population in increasing and decreasing districts than in comparatively stationary ones. It will be noticed too that, on the whole, the numbers of births, marriages and deaths lag behind those of population. This will be better seen from the correlation formulæ below. Another point worthy of note is that in each case r_{13} is large, or that there is considerable correlation between excess of births and of deaths. Excess of marriages, however, is less correlated with either of these than they are with one another.

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* I regret that, through the exigencies of space, the Council has been unable to sanction the publication of the tables of data. I shall be pleased to lend the MSS. of these tables to any Fellow of the Society who may wish to see them.

From the above figures a number of formulæ can be deduced by the method given in §12. Those connecting x_0 with a single one of x_1, x_2 or x_3 are of little use, and are not stated. Those obtained by taking any two of the latter variables and also all three are given in full. In using these formulæ it is convenient to write p, b, m and d for x_0, x_1, x_2 and x_3 respectively. The formulæ are:—

A.

(1) $p=7{\cdot}76\,m+3{\cdot}56\,d+2470$
(2) $p=2{\cdot}92\,d+1{\cdot}90\,b+2960$
(3) $p=1{\cdot}88\,b+7{\cdot}18\,m+1800$
(4) $p=1{\cdot}22\,b+6{\cdot}31\,m+1{\cdot}92\,d+2220$

B.

(1) $p=2{\cdot}02\,m+0{\cdot}82\,d+470$
(2) $p=0{\cdot}44\,d+0{\cdot}40\,b+373$
(3) $p=0{\cdot}40\,b+1{\cdot}73\,m+361$
(4) $p=0{\cdot}19\,b+1{\cdot}83\,m+57\,d+455$

C.

(1) $p=3{\cdot}84\,m+1{\cdot}93\,d+630$
(2) $p=1{\cdot}16\,d+0{\cdot}78\,b+410$
(3) $p=1{\cdot}01\,b+2{\cdot}73\,m+350$
(4) $p=0{\cdot}31\,b+3{\cdot}35\,m+1{\cdot}52\,d+610$

D.

(1) $p=8{\cdot}46\,m+2{\cdot}86\,d+1910$
(2) $p=1{\cdot}86\,d+1{\cdot}96\,b+2120$
(3) $p=1{\cdot}50\,b+7{\cdot}32\,m+1510$
(4) $p=0{\cdot}71\,b+7{\cdot}35\,m+1{\cdot}93\,d+1830$

In every one of these sixteen formulæ the constant is of positive sign, so that in any district taken at random from these 103, in which the births, marriages and deaths were stationary, we should expect an increase of population. This could be inferred from the fact that in the period under notice the birth- and death-rates were declining. The coefficients vary considerably in magnitude between the different groups, and the formulæ of group A have far greater coefficients than those of B or C.

20. The above formulæ are now assumed to hold throughout the decade 1891-1901. The actual numbers of births, marriages and deaths during this decade were obtained from the *Supplement to the 65th Annual Report of the Registrar-General*, and the excesses of these over the corresponding numbers of the preceding period found. These were used as the variables in the right-hand side of the various equations and the corresponding increases of population between 1891 and 1901 worked out. The actual populations in 1901 were then obtained.

The errors measured from the actual population as determined by the census of 1901 were ascertained and expressed as percentages of the estimated populations. These percentage errors are given for a number of the formulæ in Table I, together with the corresponding errors reached by the Registrar-General's method, and also by assuming the number of persons per inhabited house to be constant. Much work is necessary to establish the results by all the formulæ, and those given by (1) and (2) are found for A only. The "root mean square" of the errors in each case was then found. An additional group E was formed by taking the results given by A and C for the whole 103 districts.

The "root mean square" errors are :—

	A.	B.	C.	D.	E.
Formula (1)	9·29	—	—	—	—
,, (2)	8·11	—	—	—	—
,, (3)	7·83	5·99	5·32	6·74	6·39
,, (4)	7·98	5·81	4·98	7·23	6·29
Registrar-General	15·12	6·00	7·93	11·21	11·21
Constant house rate	3·96	3·62	3·79	3·85	3·85

It will be seen that the hypothesis of a constant number of persons per house from census to census gives far and away the best results, but as information concerning the number of houses is at present only obtained at the census, the figures reached from it hardly compete with those obtained by the other methods, which are available at any time. If, however, as will be seen later, the number of inhabited houses is introduced into the multiple correlation formulæ, the results by these are greatly improved. Table I at the end of the paper and the above figures both show that far better estimates can be formed from the formulæ reached so far in the present paper than by the official method. This is particularly evident in the case of rapidly expanding populations. The greatest errors in each case are :—

	A.	B.	C.	D.
Formula (3)	25·13	21·46	20·53	29·33
,, (4)	23·42	20·36	17·21	21·09
Registrar-General	49·92	22·45	27·95	49·92

These figures do not give a good standard of the merit of the method, for in some cases the maximum error stands completely by itself, the large majority of the errors being far smaller.

21. A little consideration will show that it is not altogether satisfactory to measure the increases of births, marriages and deaths over ten-year periods. For in the first and a portion of the second of the two decades the population might increase, but in the latter portion of the second it might diminish, so that the population was no greater at the final census than at the preceding one. Assuming,

for a hypothetical case, that the births, marriages and deaths approximately followed the same line as the population, we should have a large excess in the figures of the former over the corresponding ones in the previous ten years without having any increase of population. Or a reverse curve might more accurately express the distribution of the figures. Here a defect of births, marriages and deaths might, on the same assumption, be attended with an appreciable increase of population. As an actual example, the figures for Rugby (393) may be taken. The distributions of the births, marriages and deaths from 1880-1900 were :—

	Births.	Deaths.	Marriages.
1880	866	458	166
'81	820	435	192
'82	816	427	187
'83	832	404	185
'84	809	398	178
'85	847	444	181
'86	868	474	182
'87	814	410	148
'88	765	386	203
'89	766	390	152
'90	719	434	157
1891	745	545	157
'92	744	369	187
'93	770	405	195
'94	752	371	179
'95	745	448	186
'96	798	405	218
'97	865	453	232
'98	886	438	228
'99	863	464	230
1900	851	542	211

These figures (smoothed by taking the mean of three consecutive years to be the observation for the middle of those years) are plotted in the diagrams earlier in the paper. Parabolas up to the fifth order were fitted to the points, but the fit was not good, and no generalised representations of the data are given by them, and they are not shown. The increase of population of this district from (2) to (3) was 6,864.

The excess of births in (2, 3) over (1, 2) was .... − 37
,, marriages ,, ,, ... + 258
,, deaths ,, ,, ... + 238

It will be seen from the table that this particular district gave the worst result both by formulæ (2) and (3), the reason being that the above excesses do not give an adequate measure of the rate at which the births, marriages and deaths were increasing from 1891-1901. Clearly a better measure in this case would be obtained by taking the excesses of births, marriages and deaths in the five years 1896-1901 over those in 1891-96. The figures for these are 507, 164 and 215 respectively. Had the births, marriages and deaths varied uniformly throughout the twenty years, the numbers for the excesses in the ten-year periods would have been four times the above numbers, or 2,028, 656 and 860 respectively, as against − 37, 258 and 238 actually given by the ten-year period.

This example suggests that the excesses of births, marriages and deaths in the five-year periods composing the decade should be taken into account, in addition to the corresponding figures for the whole decade over the previous one. To depend on the former alone would be as unsatisfactory as to take only the ten-year intervals. A rough way of using both measures will be obtained by taking the mean of the results given by each to be the true estimate. There is no sound statistical basis underlying this procedure, and it can only be justified by the results it gives. It assumes that instead of b, m and d—the excesses in ten-year periods—four times the corresponding excesses in the five-year periods can be taken. In other words, the curves obtained when the births, marriages and deaths are plotted for successive years are assumed to be straight lines. This may be the case for a few districts, but cannot generally be so.

More consideration of the subject would probably lead to the discovery of a far better function to express rate of increase of births, marriages and deaths than the crude method to be used here. The imperfections of this are manifest; it is employed to obtain a rough notion of the possibilities of the method, but no satisfactory mathematical foundation is claimed for it.

22. Accordingly the figures for the 103 districts for each of the years between 1891 and 1901 were tabulated from the various Annual Reports of the Registrar-General, and the excesses of the births, marriages and deaths from 1896-1901 over 1891-96 were found. Four times these numbers were then used as the variables in the right-hand sides of equations (3) and (4) of A, B and C to estimate the population in 1901. The errors arising in this way are given in Table II. The "root mean square" errors are—

	A.	B.	C.	E.
Formula (3)	8·08	4·53	3·78	5·80
„ (4)	7·42	4·47	4·61	5·84

The column E gives the result obtained by clubbing together A and C. The corresponding figures of the Registrar-General are 15·12, 6·00, 7·93 and 11·21 respectively, as before. The figures in the table are a distinct improvement on those reached by the last mode of employing the formulæ. The largest errors are—

	A.	B.	C.
Formula (3)	18·58	13·92	11·66
„ (4)	19·57	13·50	13·46

and belong to different districts from those giving the greatest errors before.

23. The errors obtained by combining the ten-year and the five-year method of measurement are given in Table III. The "root mean square" errors in this case are—

	A.	B.	C.	E.
Formula (3)	6·26	5·16	3·93	4·94
,, (4)	6·43	5·01	3·97	5·04
Registrar-General	15·12*	6·00	7·93	11·21

* The corresponding "root mean square" error by Mr. Waters' method (§ 7) is 14·78, a slight improvement upon the present official method, but considerably inferior to those given by the formulæ of this paper.

the maximum errors being :—

	A.	B.	C.
Formula (3)	12·57	17·57	13·12
,, (4)	16·19	16·83	11·00
Registrar-General	49·92	22·45	27·95

The estimates reached in this manner are put forward to show roughly the possibilities of the new method. The criterion of the poorness of those estimates—viz., the "root mean square" of all the errors—is less than half that given by the Registrar-General's method. It can be confidently anticipated that if greater refinements of grouping and data are used even better results can be reached.

24. A possible test of the efficiency of the formulæ found lies in the comparison of them with the corresponding ones arrived at by using the data for the period (2, 3) and the populations of the census (3). These formulæ by their nature will be such that the "root mean square" error obtained by using the data of births, marriages and deaths on which they are based is the least possible. The closeness with which the "root mean square" errors found in the previous paragraph approach those found under these circumstances will be a measure of the permanency of the correlation formulæ during two consecutive decades. It should be emphasised, however, that the "root mean square" errors to be obtained in the present paragraph do not represent the best the method is capable of, even with the rough data and experimental grouping used. For the results found now are reached from groupings of the districts according to certain rough measures of homogeneity in the *previous* period. But these groupings do not remain permanent, and a district which showed only a small increase or even a decrease of

population in one period may show a considerable increase in the next. More will be said on the method of groupings later; for the present it should be borne in mind that the "root mean square" errors now found are for comparison with those previously ascertained, and do not give a measure of those ideally possible by the method of correlation. That ideal would be reached by calculating the "root mean square" error which arises from using the actual data in the formulæ obtained from that data.

The statistical constants for the same groupings of districts—A, B, C and D—as before were accordingly worked out from the data of (2, 3) over (1, 2), and the increases of population from (2) to (3). They are:—

	A.	B.	C.	D.
$\bar{x}_0$	+7,400	+ 560	+ 210	+ 2,930
$\bar{x}_1$	+ 970	− 750	− 840	− 160
$\bar{x}_2$	+ 580	+ 130	+ 110	+ 290
$\bar{x}_3$	+ 630	− 150	− 290	+ 100
σ_0	9,200	1,680	1,660	6,780
σ_1	1,750	440	490	1,440
σ_2	480	120	120	380
σ_3	1,060	170	240	800
r_{01}	·928	·514	·495	·840
r_{02}	·910	·572	·574	·914
r_{03}	·960	·490	·473	·947
r_{12}	·784	·389	·504	·844
r_{13}	·825	·483	·640	·866
r_{23}	·896	·269	·505	·901

These constants should be compared with those in §19. A glance at the means and standard deviations shows that the districts have become a far more rapidly increasing lot than in the previous period. In group A we see that some of the districts must have receded to the state of those in B and C before, but others have made great strides and the mean is almost doubled. It should be noticed, too, that the excess of marriages was much greater proportionally than the excesses of births and deaths. This was very evident in almost every district, and points to a comparative increase in the marriage-rate and decreases in the birth- and death-rates, in the districts dealt with, which have hardly received the prominence and comment deserved. Other conclusions can be drawn from these means and standard deviations.

The correlations, particularly those in group A, have not greatly altered. Some of the districts in that group are now increasing very rapidly, and these exert a dominating influence on the magnitude of the correlations. Those between increase of population and the other variables in groups B and C have diminished, showing that the districts comprising these groups have become more variable. In group D the correlations have increased owing to the influence exerted by the districts of rapidly increasing population.

The multiple correlation formulæ were worked out from the above constants as before, and are :—

A.

(1) $p=4{\cdot}86\,m+6{\cdot}36\,d+570$
(2) $p=5{\cdot}26\,d+2{\cdot}25\,b+1900$
(3) $p=2{\cdot}94\,b+9{\cdot}15\,m-810$
(4) $p=2{\cdot}14\,b+3{\cdot}08\,m+4{\cdot}18\,d+900$

B.

(1) $p=8{\cdot}24\,m+3{\cdot}52\,d+60$
(2) $p=3{\cdot}07\,d+1{\cdot}39\,b+2080$
(3) $p=1{\cdot}32\,b+6{\cdot}28\,m+750$
(4) $p=0{\cdot}85\,b+5{\cdot}91\,m+2{\cdot}64\,d+860$

C.

(1) $p=6{\cdot}05\,m+1{\cdot}68\,d-70$
(2) $p=1{\cdot}80\,d+1{\cdot}11\,m+1560$
(3) $p=0{\cdot}94\,b+5{\cdot}85\,m+360$
(4) $p=0{\cdot}69\,b+5{\cdot}39\,m+0{\cdot}96\,d+420$

D.

(1) $p=3{\cdot}95\,m+5{\cdot}56\,d+1260$
(2) $p=7{\cdot}44\,d+0{\cdot}38\,b+2280$
(3) $p=12{\cdot}56\,m+1{\cdot}13\,b-530$
(4) $p=5{\cdot}57\,d+5{\cdot}73\,m-0{\cdot}01\,b+740$

If these formulæ are compared with those of A, B, C, and D of §19 it will be noticed that the coefficients in those of the present paragraph are larger throughout. Thus the earlier formulæ which were used for prediction give results which are, on the whole, too small. The figures in Table II show that this is the case in the majority of the districts. It does not necessarily follow, however, that the "root mean square" error given by any one of the previous sets of equations is greater than that error obtained from the corresponding equation of the present paragraph. For these equations have been reached by making the sum of the squares of the absolute errors a minimum. There should be, therefore, about as many with the negative sign as there are with the positive. The estimates given by the formulæ of §19 may turn out to be uniformly too low without, however, the "root mean square" error being much greater. The "root mean square" errors derived from some of the latest formulæ by using the data on which they were based are :—

	A.	B.	C.	D.	E.
Formula (4)	7·16	4·41	4·58	6·05	5·70

The actual errors from which these figures were derived are shown in Table IV.

These are not much less than those given by (4) of §19, and we conclude that, judged by the criterion adopted, the formulæ of the first period represent the second fairly well.

25. One other test can be applied to ascertain if the multiple correlation equations can be assumed to be permanent over a period

of twenty years. This is to apply the formulæ found from the latest data to that of the earlier period. If the formulæ are reasonably permanent, this procedure of reversing the order should give rise to results the "root mean square" error of which is not appreciably greater than that obtained by the direct application of the equations. The figures found in this manner are collected in Table V, and the "root mean square" errors are:—

	A.	B.	C.	D.	E.
Formula (4)	8·79	5·61	3·70	10·28	6·14

To judge of the degree of permanence of the formulæ, the figure under E—obtained by clubbing together A and C—should be compared with the corresponding figures in § 20 and § 24. We then have the following figures as a measure of the permanency of the correlation equations:—

Formula of first period tried on data of second............	6·29
,, second ,, ,, ,, ...	5·70
,, ,, ,, ,, first	6·14

These numbers agree sufficiently well to justify the use of the formulæ throughout the period following the one on which they were based, and we conclude that the hypothesis of the permanency of the correlation formulæ obtained in this paper is sound.

26. *Example II.*—As another example of the method, a group of 96 registration districts was taken, in which the number of persons per inhabited house was very roughly between 5 and 6 at the census of 1881—more exactly, from 4·9 to 6·1 persons per house was the range adopted. No restriction was placed on the size of the districts used, which varied in population from 40,000 to 530,000 persons. The increase of population and the increase of inhabited houses between 1881 and 1891 for these were found from the census reports, and the correlations between those increases worked out. A formula connecting the increase of population (p) with the increase of houses (h) was then obtained. This was used to estimate the population of the districts in 1901, in the same manner as before.

For another variable in the correlation formula the natural increase of the population—*i.e.*, births minus deaths—between 1881 and 1891 was taken. The natural increase rate varied considerably among the districts, the range being from 6·63 to 21·71. The group of districts, therefore, though fairly homogeneous as regards persons per house, was not so as regards natural increase. In consequence of this the districts were divided into two groups of

44 and 52 respectively, in the former of which the natural increase rate was less than and in the latter was greater than 15 in the decade 1881-1891. Three distinct sets of correlations and formulæ were derived in this way. These will be denoted by α—for the 44 districts, β—for the 52 districts, and γ—for the whole 96 districts. The notation used was :—

Increase of population from 1881-91 .... x_0 or p
" inhabited houses from 1881-91 .... x_1 " h
Natural increase in the period 1881-91........................ x_2 " n

The means, standard deviations and correlations are :—

	α.	β.	γ.
$\bar{x}_0$	12,250	16,610	14,610
$\bar{x}_1$	2,640	3,130	2,900
$\bar{x}_2$	10,110	15,140	12,840
σ_0	10,350	19,280	15,970
σ_1	2,240	3,590	3,060
σ_2	7,150	9,830	9,060
r_{01}	·980	·940	·946
r_{02}	·821	·802	·799
r_{12}	·871	·746	·766

These figures indicate that the districts were, on the whole, an expanding lot, the mean increase of population in each case being greater than the corresponding mean natural increase. Each variable, too, showed a large coefficient of variation. The group (β) which had the larger natural increase, had also the larger total increase of population. The correlations are all considerable, and those between increase of population and the other variables do not differ much in the three groupings. The following equations were obtained from the above data :—

	α.	β.	γ.
(i)	$p = 4{\cdot}53\,h + 290.$	$p = 5{\cdot}05\,h + 800.$	$p = 4{\cdot}95\,h + 240.$
(ii)	$p = 1{\cdot}19\,n + 240.$	$p = 1{\cdot}57\,n - 7230.$	$p = 1{\cdot}41\,n - 3490.$
(iii)	$p = 5{\cdot}11\,h - 0{\cdot}20\,n + 780.$	$p = 4{\cdot}14\,h + 0{\cdot}45\,n - 3100.$	$p = 4{\cdot}23\,h + 0{\cdot}32\,n - 1740.$

Owing to alteration of boundaries the estimates of the population at the census of 1901 were found in 37 districts only for α, and in 39 districts for β. The errors of the estimates were worked out for these districts for equations (i) and (iii), and are given in Table V. On account of the great variability of the districts as regards natural increase, the results by (ii) are not likely to be close to the actual populations, and have not been found.

The errors of the estimates made by the Registrar-General's method and also by assuming a constant number of persons per house were ascertained for the same districts. The "root mean square" errors in each case are :—

	α.	β.	γ.
Formula (i)	4·04	4·06	3·91
„ (iii)	4·34	4·05	4·01
Registrar-General	9·42	12·29	10·99
Constant house rate	4·88	4·04	4·47

If the formulæ (i) and (iii) of γ are applied to the districts comprising α and β separately, the figures are 4·56, 4·25, and 3·18, 3·76 respectively. The errors (obtained by combining the results given by α and β) over the whole of the districts are 4·05 and 4·20 for equations (i) and (iii) respectively.

These results again bring out the great improvement which would accrue in the estimation of population if information concerning inhabited houses could be readily obtained for that purpose. The estimates by the Registrar-General's method are not called into comparison now, and it is the last row of figures with which the results by the new method must be compared. First, however, we may note that (iii) gives results inferior to (i), or the introduction of the information concerning natural increase has not improved the accuracy with which the estimates are made. This may, of course, be due to the rough manner in which the data of natural increase were arranged. Very probably it is quite possible to arrange the districts into smaller groups so that an appreciable improvement may be reached by the use of an extra variable. Secondly, the correlation formula based on houses alone gives results superior to those obtained by assuming a constant number of persons per house. This superiority is not greatly marked in the present example, but the grouping here is quite crude. The figures reached, however, are sufficiently promising to suggest that if a smaller range were used in the groupings even better results would be found.

27. *Example III.*—The last example which will be given is based upon the figures of London parishes. Statistics of population, inhabited houses, and rateable value, are given for 59 such districts in the various statistical abstracts issued by the statistical officer of the London County Council. These districts are a particularly heterogeneous lot in every respect. The populations at the census of 1881 ranged from 9,000 to 280,000. They include such places as Kensington, St. George's, Hanover Square, and Hampstead, on the one hand, and Bethnal Green, Bermondsey, and Shoreditch, on the other. The number of persons per inhabited house at the census of 1881 varied from just over 6 in Plumstead and Lewisham to over 13 in St. Anne, Westminster. As regards rateable value, we find that between 1881 and 1891 that of Kensington increased by more

than 350,000*l*., accompanied by an increased population of only 3,157. The district of Charlton, however, with an increase of population during the same period of 2,978, only expanded in rateable value by just over 11,000*l*.

As these districts form a complete municipal unity among themselves, it was decided, in spite of the huge differences occurring among them, to apply the method of this paper. Accordingly the populations at the censuses of 1871, 1881 and 1891, together with the number of inhabited houses and the rateable value of the parishes were tabulated. From these the increase in each variable between the censuses was found. The notation adopted was:—

Increase of population from 1871 to 1881 .... x_0 or p
,, inhabited houses from 1871 to 1881........ x_1 ,, h
,, rateable value ,, ... x_2 ,, r

At first no grouping of the 59 districts was made, but the correlations and formulæ found for the whole as a single series. The statistical constants derived for the whole 59 districts were:—

$$\bar{x}_0 = 10190 \qquad \sigma_0 = 17720 \qquad r_{01} = \cdot 984$$
$$\bar{x}_1 = 1210 \qquad \sigma_1 = 2120 \qquad r_{02} = \cdot 666$$
$$\bar{x}_2 = 111360 \qquad \sigma_2 = 129940 \qquad r_{12} = \cdot 724$$

and these lead to the equations—

$$p = 8{\cdot}221\,h + 230.$$
$$p = 8{\cdot}817\,h - 0{\cdot}013\,v + 1010.$$

The means and standard deviations show what an extremely variable lot the districts were as regards the increases in the population, houses and rateable value. It is surprising that the correlation r_{01} has such a high value as ·984. It points to the conclusion that, although the districts differed greatly in respect of the actual number of houses to the population, yet the increases in these numbers tended to a more uniform proportion throughout the districts.

Secondly, the 59 districts were divided into two divisions—30, in which the population per house in 1881 was greater than 7·5, approximately, and 29 in which it was less than 7·5. These groups will be called F and G respectively, and gave the following constants:—

	F.	G.		F.	G.
$\bar{x}_0$	5,630	14,920	σ_2	156,010	97,690
$\bar{x}_1$	550	1,890	r_{01}	·956	·992
$\bar{x}_2$	129,170	92,930	r_{02}	·664	·943
σ_0	15,760	18,390	r_{12}	·640	·969
σ_1	1,670	2,360			

the corresponding equations being—

$$\left.\begin{array}{l} p = 9{\cdot}042\,h + 640 \\ p = 8{\cdot}506\,h + 0{\cdot}010\,v - 210 \end{array}\right\}\ \mathrm{F}$$

and

$$\left.\begin{array}{l} p = \ \ 7{\cdot}734\,h + 270 \\ p = 10\,004\,h - 0{\cdot}057\,v + 1230 \end{array}\right\}\ \mathrm{G}$$

It will be noticed that in arranging the parishes according to persons per inhabited house, we have incidentally grouped them so that one lot is increasing far more rapidly than the other in population and houses. But the mean rateable value of the latter category is greater than that of the former. The class with over 7·5 persons per house contains some anomalous districts in which a change in the type of property considerably affected the rateable value, without greatly altering the relation between population and houses. The correlations in this group are less than those in the whole 59 districts; in the other they have increased to very high values. The formulæ, too, have altered, moving on either side of those for the whole 59.

Lastly, a further subdivision was adopted, in order to make the range of the number of persons per inhabited house smaller. The number of districts in each class will now be small, and the correlations, therefore, will not be such reliable expressions of the permanency of relationship. Group G was split up into H and J, the former containing those districts (12) with less than 6·5 persons per house in 1881, and the latter, those (17) between 6·5 and 7·5. F in the same way was divided into K, having 17 districts with between 7·5 and 9·0 persons per house in 1881, and L, which contained all those over 9·0. The constants in these classes were:—

	H.	J.	K.	L.
$\bar{x}_0$	6,130	22,060	11,320	− 1,820
$\bar{x}_1$	920	2,680	1,150	− 230
$\bar{x}_2$	44,310	132,440	158,940	+ 90,230
σ_0	4,940	21,900	18,360	5,840
σ_1	750	2,870	1,910	390
σ_2	31,170	114,130	180,810	91,810
r_{01}	·987	·993	·995	·904
r_{02}	·962	·929	·748	·508
r_{12}	·945	·969	·755	·480

L now contains most of the anomalous parishes, there being in that class a considerable increase in mean rateable value with an actual decrease in the means of the other variables. The correlations in that group, too, are smaller. In the other groups, however, the values of r_{01} are very high, and in J and K increases of population and of houses are nearly perfectly related. In H and J the former is also highly correlated with increase in rateable value. The equations for the different groups are:—

H.

(i) $p = 6{\cdot}516\,h + 110$

(ii) $p = 4{\cdot}785\,h + 0{\cdot}044\,r - 240$

J.

(i) $p = 7{\cdot}578 + 1740$

(ii) $p = 11{\cdot}612\,h - 0{\cdot}105\,r + 4790$

K.

(i) $p = 9{\cdot}580\,h + 310$

(ii) $p = 9{\cdot}628\,h - 0{\cdot}001\,v + 360$

L.

(i) $p = 13{\cdot}704\,h + 1330$

(ii) $p = 13{\cdot}012\,h + 0{\cdot}006\,r + 620$

These equations differ greatly from the two obtained when the whole 59 parishes were taken together. Unless, therefore, by the close of the next period the districts have become far more similar, the single pair of formulæ for the whole 59 districts will not give such good estimates as will the four separate pairs above. The populations at the next census (1891) were calculated from the last four series of formulæ, and the errors derived from them are given in Table VII, together with the corresponding ones obtained by the Registrar-General's and the constant house rate methods. The "root mean square" errors for the four groups are:—

	H.	J.	K.	L.	M.
Formula (i)	6·39	7·96	7·95	8·84	7·86
„ (ii)	3·73	11·12	7·60	8·48	8·42
Registrar-General	19·08	17·17	11·49	8·80	14·63
Constant house rate	4·41	18·31	7·61	6·84	11·29

the last column giving the numbers obtained by clubbing together those from the four separate classes. Some considerable errors will be noticed from the tables, especially in Group J. A single parish —Shadwell (see §10)—is chiefly responsible for the bad estimates by (i), (ii) and the constant house rate method, the official estimate being quite close to the actual population.

It will be seen that, measured over the whole series of 59 parishes, the new method again gives better results than those previously considered best. The large errors arising in this example are rather significant. Many of the districts had passed the limit of growth, and their populations were diminishing and flowing into parishes farther from the centre of London. It appears to be almost as difficult to compute the number of inhabitants of such districts of out-flowing population as in the case of those with in-flowing population. A number of our larger towns and cities have reached that position now, and are developing suburbs. Thus there is the two-fold difficulty of estimating the populations both of the districts which the people are leaving and of those they are entering. It is important to have the best possible methods of arriving at the number of inhabitants in districts of these types.

28. The examples worked out on the rough data and crude arrangement of this paper must suffice for the present to show the

application of the method of multiple correlation to the estimation of populations.

It has been shown that if the figures of births, marriages and deaths alone are used, results superior to those reached by the hypothesis of uniform increase or decrease can be obtained. This is particularly so in the case of rapidly filling districts, where that hypothesis frequently under-estimates by quite large amounts. The equations reached in the present paper also under-estimate such districts, but to a smaller extent. It is in these districts that accurate knowledge of death-rates is most desired, and the method of this paper is particularly recommended for a trial in such cases.

Again, if the figures of inhabited houses are taken into account, the multiple correlation formulæ lead to results slightly better than those found by assuming a constant number of persons per inhabited house between two censuses. The errors of estimation when the information of inhabited houses is used in any manner are far less than those arising from any other data. But with the changing conditions of housing at the present time the figures of inhabited houses must be used with caution. Also the distinction between an "inhabited" house and a house for rating purposes must be kept in mind (§ 10). It is of the latter that information is generally obtained between censuses.

In any case the method of multiple correlation will, it is advocated, if the districts are wisely grouped, lead to estimates differing, on the whole, from the actual populations by smaller numbers than by any of the methods yet employed.

29. In the first example given, in which the population was estimated from the most readily accessible data—births, marriages and deaths—the large towns and cities were not used, and it may be said that the method will not apply to them. If the figures are used in their crude form and refer to the whole of a large district such criticism is probably valid. If, however, the very large districts are divided into sub-districts (these to be put into their appropriate groups without reference to one another) and allowance is made for births and deaths in institutions, there is no reason to suppose that the method will give results inferior to those found in the districts of from 20,000 to 50,000 inhabitants dealt with in the example. On the contrary, since the increase of population of such a sub-district is frequently no larger than that of some of the smaller districts dealt with, while the absolute population is often much greater, the percentage error is, on the whole, likely to be less in the former than in the latter.

It may, again, be argued that no knowledge of the closeness of the results derived from such formulæ for dates, six, seven or eight years after the census has been or can be deduced from the knowledge of that ten years after the census. The same argument can be applied to any of the means of estimation, and there is no way of examining it. The arrangement of the data, if this method were to be applied to compute the population at, say, six years after the census, would undoubtedly require some consideration, and it might be found desirable to make use of the *estimated* population for ten years previous. This population can be found with fair accuracy when the two census populations around it are known.

A third point which may be brought forward against the method is, that it worked well in the period on which it was tried because the marriage rate in most of the districts was moving in the opposite direction to the birth and death rates, and therefore tended to neutralize the defect caused by the instability of the latter. This point has been partially cleared up by applying the formulæ in the reverse order (§ 25), and it could be more thoroughly investigated by using earlier periods. If any great change took place in the birth, marriage and death rates and they all moved rapidly in the same direction, the results by the present method would suffer, but judging from our own figures and those of many foreign countries, the contingency is not a very probable one. If the demographic rates become fairly stable again, the results are likely to be an improvement upon those given at the present time.

30. Other examples and arrangements of the data could be multiplied without end. It is not suggested in any of the examples given that the material has been arranged in the best manner, and no value attaches to the particular groupings used. Experienced officials are no doubt sufficiently acquainted with the characteristics of the various districts to suggest far more valuable classifications. No pretence has been made in the present paper to consider homogeneity of industrial or residential conditions. For example, the Romford registration district, purely a dormitory of London and recruited in large part by people recently married elsewhere, is placed in the same group as Wellingborough and Barnstaple. The only reason for this is that they all showed an increase of population of more than 1,000 between 1881 and 1891. But that increase of population was obtained quite differently in the various districts. Romford showed a large immigration, Wellingborough practically none, while Barnstaple showed a fair amount of emigration and only reached its position by a large natural increase. Official experience would no doubt have classified the districts so that the three mentioned were in distinct groups, thereby increasing the correlations and the efficiency of the results.

One of the many alternative groupings of the data which have been thought of, however, may be mentioned. In this the districts are to be arranged in groups not according to excess of population, but according to excess of births, marriages or deaths. Thus, for a simple case, the classification might be into three in which the excess of births was (*a*) greater than 1,000, (*b*) between zero and 1,000, (*c*) negative. Formulæ would be derived as before from this arrangement. Thus we should get an equation which would apply to districts in which the excess of births was greater than 1,000, &c. This would be used for the estimation of the population in the next period of all districts satisfying the conditions as regards births, whether such districts had been included in the group from which the equations were derived or not. Thus a district which was included in (*c*) for the purpose of obtaining a formula might, owing to its rapid expansion, be placed in (*a*) in order to estimate its population at some period after the census. A series of formulæ, therefore, might be worked out after a census based upon various classifications of the excesses of births, marriages and deaths. All that would then be necessary to estimate the population of a particular district would be to ascertain, from its figures of births, marriages and deaths, under which group it came, and then to apply the corresponding formula. Once the equations had been reached the work involved would be quite light. Of course, other variables—inhabited houses, parliamentary voters, school children, &c.—might be used if the figures for such were available and satisfactory.

31. Many other possible improvements could be suggested. For instance, the age distribution of the inhabitants of a district has great effect on the numbers of births, marriages and deaths occurring there. With a favourable distribution the figures of one or more of these might be high without the population increasing so rapidly as would be expected if the distribution were the normal for the country. The age distribution at the previous census, therefore, might with advantage be taken into account. It might, too, be useful to estimate the population of the various age-groups separately. The increase of the population in some age-groups might be more highly correlated with the excesses of births, marriages and deaths than in other groups. Different formulæ, therefore, would apply to different age-groups.

The possibilities of improvement in the method seem, in fact, to be numberless. There has been a great temptation to try many of these, which pressure of other work has curbed. No clerical assistance whatever has been available in all the labour involved in the hundreds of calculations. Having shown that better results *can* be achieved by the application of the method of multiple correlation than by the hypotheses at present in use, I feel at liberty to leave its improvement and embellishment, if the method is deemed worthy of trial, to others who have adequate clerical assistance at command.

The important figures in all the calculations have been verified, but with no help to obtain independent confirmation of the results it is possible that errors have crept in. It is hoped that none of these are serious. The general conclusions of the paper, however, can hardly be affected, since the various formulæ tend to verify each other.

Table I.—*Errors from the formulæ of* § 19 *and from other methods for Example* I.

Number of district.	Actual population, 1901.	Percentage error by Registrar-General's method.	Percentage error by constant house rate.	Percentage error by formula (1).	Percentage error by formula (2).	Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (3).	Percentage error by formula (4).
		Group A.						**Group D.**	
47	28,280	+ 7·8	+ 5·9	+ 13·9	+ 0·9	+ 6·0	+ 8·2	+ 6·7	+ 9·9
60	28,190	− 4·6	+ 3·6	+ 8·3	− 2·3	− 0·4	+ 3·4	− 0·5	+ 3·5
69	23,937	− 18·9	− 1·3	+ 3·2	− 7·7	− 7·1	− 2·7	− 8·6	− 3·1
82	38,926	− 0·2	+ 6·7	− 20·1	+ 3·9	+ 1·1	+ 6·5	0·0	+ 6·4
107	30,513	− 8·9	+ 1·4	+ 5·6	+ 0·9	+ 0·5	+ 2·9	− 1·3	+ 1·7
121	23,554	+ 2·9	+ 7·4	+ 13·5	+ 6·1	+ 8·2	+ 10·1	+ 6·9	+ 9·6
124	33,861	− 11·6	+ 4·8	+ 6·4	− 3·4	+ 4·6	+ 4·4	+ 3·1	+ 4·0
136	33,008	− 7·2	+ 1·3	− 1·3	− 11·1	− 7·1	− 5·4	− 7·6	− 5·1
145	28,000	− 3·9	+ 0·8	+ 2·8	− 2·4	− 0·9	+ 0·1	− 1·3	+ 0·1
163	56,042	− 10·0	+ 3·3	− 0·6	− 4·5	+ 1·0	0·0	− 1·0	− 1·4
167	53,859	− 8·3	+ 3·9	+ 2·9	− 9·5	− 0·8	− 0·5	− 1·1	+ 0·4
179	38,379	+ 1·7	+ 5·8	+ 5·2	+ 5·5	+ 7·4	+ 6·3	+ 6·3	+ 5·2
181	32,103	+ 2·6	+ 2·2	+ 3·4	+ 3·2	+ 1·6	+ 2·5	+ 0·8	+ 1·6
187	30,461	+ 1·3	+ 1·1	+ 8·6	− 0·5	+ 2·9	+ 4·8	+ 2·0	+ 4·8
189	95,455	− 49·9	− 0·4	− 13·9	− 20·2	− 25·1	− 18·3	− 29·3	− 21·1
190	33,746	+ 12·5	+ 1·1	+ 7·5	+ 3·0	+ 5·1	+ 6·1	+ 3·1	+ 4·7
192	36,297	− 1·4	+ 4·6	+ 5·9	− 2·8	− 0·5	+ 1·5	− 0·2	+ 2·5
193	51,170	− 40·1	+ 4·0	− 5·1	− 18·6	− 11·8	− 9·3	− 14·6	− 10·2
262	32,337	+ 3·0	+ 6·3	+ 10·2	+ 6·4	+ 9·2	+ 9·7	+ 6·8	+ 7·9
264	42,926	− 28·0	− 6·8	− 2·8	− 11·8	− 6·1	− 5·4	− 7·4	− 5·7
285	42,060	+ 6·6	+ 5·0	+ 3·4	+ 2·9	+ 1·0	+ 2·1	+ 0·7	+ 1·7
316	25,763	+ 2·7	+ 2·5	+ 11·2	+ 4·0	+ 9·7	+ 9·3	+ 9·2	+ 9·4
368	24,667	− 1·7	+ 2·6	+ 14·5	+ 4·7	+ 10·0	+ 11·2	+ 8·9	+ 11·1
384	35,630	− 1·5	+ 3·6	+ 6·2	− 6·1	+ 1·1	+ 1·9	+ 1·6	+ 3·3
394	48,618	− 25·0	+ 2·4	− 5·8	− 11·4	− 7·5	− 6·6	− 11·0	− 8·9
406	44,241	− 11·0	+ 2·6	+ 6·6	+ 2·5	+ 7·0	+ 6·6	+ 5·0	+ 5·3
407	34,897	− 1·6	+ 1·4	+ 3·6	− 3·1	− 1·3	+ 0·3	− 1·8	+ 0·4
410	22,210	+ 3·2	+ 4·9	+ 10·8	+ 7·2	+ 7·1	+ 8·4	+ 6·4	+ 8·1
426	35,821	+ 2·7	+ 2·8	+ 7·4	− 2·6	+ 5·2	+ 4·8	+ 5·0	+ 5·5
440	33,661	+ 1·4	+ 3·2	+ 8·8	+ 3·2	+ 7·0	+ 7·1	+ 6·4	+ 7·1
441	26,478	+ 5·9	+ 4·3	+ 12·0	+ 7·1	+ 9·2	+ 10·1	+ 7·8	+ 9·3
477	93,697	− 29·2	+ 2·6	+ 1·0	− 12·9	− 5·6	− 3·1	− 8·4	− 3·8
485	45,261	− 9·8	+ 3·5	− 0·2	− 8·0	− 1·5	− 2·0	− 2·1	− 1·8
489	40,504	− 26·4	− 2·8	+ 1·4	− 7·5	− 3·1	− 1·3	− 5·7	− 2·6
513	25,486	+ 13·7	+ 4·6	+ 19·2	+ 18·3	+ 17·4	+ 23·4	+ 15·5	+ 16·8
515	29,507	− 4·2	+ 2·0	+ 10·6	+ 6·6	+ 9·8	+ 9·9	+ 8·3	+ 8·8
558	32,402	− 10·8	− 6·3	+ 7·2	− 2·8	+ 3·3	+ 4·3	+ 1·4	+ 3·7
596	23,693	− 5·7	+ 0·5	+ 16·6	+ 12·7	+ 13·3	+ 14·9	+ 11·3	+ 13·4
629	34,031	− 9·4	+ 4·9	+ 13·9	+ 4·2	+ 6·0	+ 9·6	+ 3·7	+ 8·6

TABLE I *Contd.—Errors from the formulæ for Example* I.

Number of district.	Actual population, 1901.	Percentage error by Registrar-General's method.	Percentage error by constant house rate.	Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (3).	Percentage error by formula (4).
		Group B.				**Group D.**	
43	27,196	−10·0	+ 4·8	−12·5	−11·4	− 7·7	− 4·4
59	26,422	+ 1·7	+ 4·7	− 1·5	− 0·4	+ 2·6	+ 5·9
61	22,275	−15·9	− 6·1	−16·0	−14·2	− 5·1	− 0·3
63	31,533	− 4·0	+ 2·1	− 7·2	− 6·5	− 6·1	− 0·3
130	21,174	− 1·6	+ 1·4	− 3·1	− 2·5	+10·0	+11·1
131	21,498	− 0·1	+ 5·7	+ 2·3	+ 3·1	+ 9·3	+11·5
133	28,749	− 2·6	+ 4·0	− 3·8	− 3·0	− 1·4	+ 1·1
153	19,283	+ 8·7	+ 4·7	+ 8·2	+ 8·9	+ 6·8	+ 9·1
155	28,555	+ 1·8	+ 3·0	+ 3·0	+ 3·5	+ 3·1	+ 4·8
172	26,718	− 0·7	+ 4·1	+ 1·5	+ 2·2	+ 5·7	+ 7·8
178	33,246	− 3·0	+ 5·8	− 4·8	− 4·0	+ 2·6	+ 4·8
182	20,096	+ 4·7	+ 3·1	+ 3·8	+ 3·5	+ 6·2	+ 5·4
185	33,105	− 2·4	+ 2·5	− 1·3	− 1·1	+ 3·4	+ 4·3
203	27,040	+ 8·0	+ 4·8	+ 7·8	+ 8·7	+ 5·4	+ 9·1
215	19,611	+ 6·8	+ 3·8	+ 5·5	+ 6·2	+ 7·4	+ 9·8
216	25,577	− 1·3	+ 2·2	− 0·6	− 0·1	+ 0·4	+ 2·3
230	21,724	+ 6·5	+ 3·8	+ 6·1	+ 6·6	+ 5·0	+ 6·9
244	22,959	− 2·6	+ 1·8	− 3·6	− 3·0	+ 3·6	+ 5·3
265	24,001	+ 1·8	+ 4·4	+ 1·2	+ 1·8	− 1·1	+ 2·0
296	32,937	− 2·3	+ 3·4	− 4·2	− 4·1	+ 1·7	+ 1·9
306	38,653	− 1·7	+ 1·3	− 4·2	− 4·0	− 1·4	− 0·6
312	22,172	+ 2·7	+ 3·6	+ 2·8	+ 3·2	+ 3·1	+ 4·6
325	22,864	+ 4·9	+ 4·2	+ 4·0	+ 5·0	+ 6·3	+ 8·5
352	28,262	— 0·7	+ 3·3	− 1·5	− 1·5	+ 3·3	+ 3·4
359	31,302	− 1·1	+ 3·0	− 2·1	− 0·9	− 0·8	+ 3·3
376	40,769	+ 2·4	+ 5·1	+ 0·1	+ 0·9	− 1·5	+ 1·5
393	34,328	−22·4	− 1·4	−21·5	−20·4	−11·3	− 9·3
396	20,842	+ 2·2	+ 4·0	+ 4·5	+ 6·1	+ 6·3	+11·6
397	20,979	− 1·1	+ 2·8	− 2·7	− 2·0	+ 3·8	+ 6·3
419	33,033	− 1·6	+ 3·3	+ 0·5	+ 1·2	+ 3·9	+ 5·9
427	25,619	− 8·9	+ 1·8	− 5·6	− 5·0	+ 2·1	+ 3·8
433	30,871	+ 0·1	+ 3·4	− 0·4	+ 0·5	+ 2·5	+ 4·9
473	23,377	− 0·9	+ 2·8	− 0·3	+ 0·2	+ 1·3	+ 3·4
519	24,454	+ 1·8	+ 3·2	+ 0·5	+ 0·8	+ 6·9	+ 7·8
546	20,354	+ 4·8	+ 5·3	+ 6·0	+ 6·4	+14·7	+ 5·6
563	23,660	− 4·1	+ 0·7	− 4·5	− 3·8	+ 5·4	+ 7·1
569	22,205	− 0·2	+ 2·8	+ 2·9	+ 3·6	+ 6·9	+ 9·2
573	22,301	+ 9·8	+ 4·6	+ 8·0	+ 8·5	+11·9	+13·1
599	31,939	+ 1·9	+ 2·9	− 2·2	− 1·5	− 3·4	+ 0·3
620	31,046	− 7·9	+ 1·0	− 4·8	− 3·8	+ 2·3	+ 6·3
626	21,897	− 0·1	+ 2·5	+ 1·9	+ 3·1	+ 3·3	+ 7·4
628	38,655	− 1·8	+ 2·1	+ 0·3	+ 0·3	+ 6·2	+ 6·4
		Group C.					
132	21,046	+ 4·4	+ 7·0	+ 6·3	+ 8·5	+ 9·4	+11·4
233	23,982	+ 6·1	+ 4·3	+ 4·4	+ 6·4	+ 5·0	+ 7·2
280	26,907	− 6·3	+ 3·1	− 5·4	− 4·4	− 5·3	− 4·6
293	23,946	+ 2·0	+ 6·2	+ 5·1	+ 5·4	+ 6·3	+ 6·1
297	33,624	− 5·6	− 0·1	− 2·8	− 3·0	− 1·8	− 2·4
298	23,171	+ 1·8	+ 9·4	+ 6·4	+ 7·9	+12·0	+13·2
299	20,773	+ 0·4	+ 1·5	+ 2·8	+ 2·7	+ 4·3	+ 4·0
339	41,978	− 2·1	+ 3·6	− 1·2	+ 0·2	+ 1·4	+ 3·0
350	23,845	−24·7	+ 1·4	− 4·3	− 4·2	+ 0·9	+ 0·2
357	25,854	−18·0	+ 0·1	− 9·4	− 8·0	− 7·2	− 4·3

TABLE I *Contd.—Errors from the formulæ for Example* I.

Number of district.	Actual population, 1901.	Percentage error by Registrar-General's method.	Per-centage error by constant house rate.	Per-centage error by formula (3).	Per-centage error by formula (4).	Per-centage error by formula (3).	Per-centage error by formula (4).
	Group C.					**Group D.**	
415	21,782	− 5·1	+ 2·0	+ 0·1	+ 2·7	+ 7·4	+ 9·4
423	28,958	+ 1·1	+ 6·2	+ 4·9	+ 7·4	+ 8·4	+10·2
527	20,454	+ 0·3	+ 4·3	+ 3·4	+ 4·9	+ 7·8	+ 8·8
532	21,743	+ 3·7	+ 5·9	− 0·6	+ 2·3	− 4·4	− 2·0
559	34,711	− 7·9	+ 5·0	− 4·7	− 3·0	+ 0·7	+ 2·0
581	28,240	− 6·5	+ 1·5	+ 2·8	+ 3·9	+ 8·7	+ 9·6
600	33,123	− 4·8	0·0	− 1·5	+ 4·1	+ 2·5	+ 4·6
605	21,471	−27·9	− 0·4	− 3·2	0·0	+ 1·1	+ 4·4
614	21,118	−16·0	+ 2·3	+ 0·9	+ 1·8	+ 5·1	+ 5·6
617	42,271	− 6·2	+ 1·8	+ 2·3	+ 4·3	+ 7·1	+ 8·9
625	27,955	− 5·5	+ 3·4	− 0·1	+ 4·8	+ 6·6	+11·0
627	42,653	−12·7	+ 1·1	− 4·6	− 3·5	+ 0·2	+ 0·6
43	The figures of these columns for Group C are identical with those of the same districts in Group B.			−13·7	−10·3		
59				− 3·9	+ 0·3		
61				−16·7	−10·8		
63				− 8·2	− 5·6		
130				− 2·3	+ 0·2		
131				+ 1·3	+ 4·3		
133				− 6·2	− 3·2		
153				+ 5·1	+ 7·2		
155				+ 0·7	+ 2·5		
172				+ 0·4	+ 2·8		
178				− 4·8	− 2·4		
182				+ 1·9	+ 1·6		
185				− 2·4	− 0·9		
203				+ 4·4	+ 7·8		
215				+ 3·5	+ 6·0		
216				− 3·0	− 1·0		
230				+ 3·1	+ 5·0		
244				− 4·4	− 2·0		
265				− 1·7	+ 0·8		
296				− 3·9	− 3·1		
306				− 4·6	− 3·8		
312				+ 0·2	+ 1·9		
325				+ 1·9	+ 4·5		
352				− 2·0	− 1·5		
359				− 4·1	− 0·2		
376				− 2·9	+ 0·1		
393				−20·5	−17·2		
396				+ 2·0	+ 7·1		
397				− 4·1	− 1·0		
419				− 1·0	+ 1·4		
427				− 5·6	− 3·4		
433				− 2·4	+ 0·7		
473				− 2·4	− 0·3		
519				+ 5·6	+ 1·8		
546				+ 6·5	+ 8·0		
563				− 3·6	− 2·3		
569				+ 1·7	+ 4·2		
573				+ 7·2	+ 8·4		
599				− 3·9	− 1·7		
620				− 4·6	− 1·4		
626				− 0·7	+ 3·3		
628				+ 0·3	+ 1·1		

Number of district.	Actual population, 1901.	TABLE II.		TABLE III.		TABLE IV.		TABLE V.		
		Errors from the formulæ of § 19 used as in § 22.		Errors from the formulæ of § 19 used as in § 23.		Errors from the formulæ of § 24 when applied to data of 1891-1901.		Errors from the formulæ of § 24 when applied to data of 1881-91.		
		Percentage error by formula (3).	Percentage error by formula (4)	Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (4).	Percentage error by formula (4).	Actual population, 1891.	Percentage error by formula (4).	Percentage error by formula (4).
		Group A.					Group D.	Group A.		Group D.
47	28,280	+ 4·0	+ 6·1	+ 5·0	+ 7·2	− 4·4	+ 6·5	28,188	+ 2·7	+ 0·4
60	28,190	+ 1·6	+ 3·5	+ 0·6	+ 3·4	− 6·2	+ 1·9	24,968	+ 6·8	+ 3·5
69	23,937	+ 2·3	+ 0·5	− 2·1	− 1·1	− 8·1	− 2·9	17,211	− 3·6	− 7·7
82	38,926	+ 4·5	+ 5·5	+ 2·8	+ 6·0	+ 7·6	+12·2	32,394	− 2·3	− 5·1
107	30,513	− 6·5	− 5·8	− 2·9	− 1·2	+ 1·4	+ 1·7	24,521	− 6·5	−10·2
121	23,554	+ 1·0	+ 0·2	+ 4·7	+ 5·4	+ 4·8	+ 7·3	20,468	−24·1	−19·7
124	33,861	+ 9·1	+ 7·2	+ 6·9	+ 5·8	− 1·0	− 0·3	26,892	+ 0·4	+ 0·6
136	33,008	+ 0·5	− 1·7	− 3·2	− 3·5	−14·4	− 8·8	26,872	− 4·1	− 9·1
145	28,000	− 4·2	− 6·3	− 2·5	− 3·0	− 9·9	− 5·7	25,613	−11·7	−18·3
163	56,042	+ 3·9	+ 1·0	+ 2·5	+ 0·5	− 0·3	− 4·4	43,653	− 5·3	− 8·9
167	53,859	+11·3	+ 7·4	+ 5·6	+ 3·8	− 7·5	− 2·6	45,352	− 9·1	− 8·1
179	38,379	− 0·4	+ 0·8	+ 3·6	+ 3·6	+ 1·9	− 1·0	36,983	+ 1·0	+ 1·7
181	32,103	+ 3·8	− 0·9	+ 2·7	+ 0·8	− 2·8	− 2·6	30,432	− 7·3	− 8·1
187	30,461	+ 3·4	+ 5·1	+ 3·1	+ 4·2	− 1·2	+ 2 9	26,137	− 4·3	− 4·7
189	95,455	− 2·2	+ 0·9	−12·6	− 7·8	− 5·4	− 7·8	50,013	+ 0·7	− 9·4
190	33,746	+ 6·1	+ 8·9	+ 5·6	+ 7·6	+ 5·2	+ 3·6	27,310	+11·5	− 4·5
192	36,297	+ 4·6	+ 4·7	+ 2·1	+ 3·1	− 7·4	0·0	34,182	−15·0	−13·4
193	51,170	+14·3	+ 9·3	+ 3·0	+ 0·9	− 7·2	− 6·8	30,271	+ 0·6	− 1·9
262	32,337	+ 4·8	+ 6·1	+ 7·0	+ 7·9	+ 9·9	+ 6·5	25,831	− 3·9	− 9·6
264	42,926	+ 5·7	+ 3·7	+ 0·2	− 0·6	− 9·8	− 8·2	32,590	− 5·3	− 8·3
285	42,060	− 3·2	− 3·5	− 1·0	− 0·6	− 2·4	− 1·0	41,368	− 4·1	− 5·0
316	25,763	+11·5	+ 9·3	+10·6	+ 9·3	− 1·3	+ 1·8	24,904	− 3·1	− 5·8
368	24,667	+12·8	+14·2	+11·4	+12·7	+ 4·0	+ 7·6	21,699	− 6·9	− 7·7
384	35,630	+11·4	+10·4	+ 6·5	+ 6·3	−10·7	− 1 9	33,311	− 1.5	− 1·7
394	48,618	+ 9·3	+ 8·4	+ 1·6	+ 1·5	− 2·4	− 7·4	29,927	+ 0·8	− 5·7
406	44,241	+ 9·9	+ 7·9	+ 8·4	+ 7·3	+ 6·0	+ 2·9	36,473	−15·6	−16·4
407	34,897	+ 5·4	+ 2·8	+ 2·2	+ 1·5	− 6·3	− 2·4	30,931	−18·9	−18·4
410	22,210	+12·9	+13·4	+10·1	+11·0	− 0·2	+ 2·5	21,590	−12·3	−18·4
426	35,821	+ 0·4	+ 2·3	+ 2·9	+ 3·6	− 1·1	− 0·7	33,183	+ 6·6	+ 0·6
440	33,661	+ 5·4	+ 0·1	+ 6·2	+ 3·7	+ 0·7	+ 2·1	32,153	−11·0	−10·1
441	26,478	+ 1·0	− 1·0	+ 5·3	+ 4·9	+ 5·7	+ 6·1	23,656	− 1·2	− 1·4
477	93,697	+19·6	+18·6	+ 8·7	+ 9·0	+ 2·3	+ 2·2	56,317	− 4·1	− 5·4
485	45,261	+ 9·3	+ 6·9	+ 4·2	+ 2·6	+ 9·6	− 7·2	38,944	− 2·6	− 4·2
489	40,504	+17·6	+17·1	+ 8·4	+ 8·8	+ 0·1	− 1·1	27,158	− 7·4	− 9·9
513	25,486	+ 6·7	+ 7·4	+12·4	+16·2	+18·3	+15·7	24,393	− 4·6	−12·9
515	29,507	+ 7·8	+ 7·2	+ 8·9	+ 8·6	+ 6·4	+ 4·8	25,977	+ 2·9	+ 0.6
558	32,402	+ 9·3	+ 7·8	+ 6·4	+ 6·1	+ 1.4	+ 2·2	24,316	−13·4	−11·8
596	23,693	+ 4·4	+ 0·5	+ 9·1	+ 8·2	+13·6	+12·2	20,483	−10·5	−16·0
629	34,031	+ 4·8	+ 5·2	+ 5·4	+ 7·5	+11·9	+12·9	24,568	−13.7	−19·0

Number of district.	Actual population, 1901.	Table II *Contd.*		Table III *Contd.*		Table IV *Contd.*		Table V *Contd.*		
		Errors from the formulæ of § 19 used as in § 22.		Errors from the formulæ of § 19 used as in § 23.		Errors from the formulæ of § 24 when applied to data of 1891-1901.		Errors from the formulæ of § 24 when applied to data of 1881-91.		
		Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (3)	Percentage error by formula (4).	Percentage error by formula (4).	Percentage error by formula (4).	Actual population, 1891.	Percentage error by formula (4).	Percentage error by formula (4).
		Group B.					**Group D.**	**Group B.**		**Group D.**
43	27,196	− 8·5	− 9·0	−10·2	−10·4	− 9·5	− 7·8	23,876	+ 6·5	+ 4·4
59	26,422	+ 0·9	+ 1·4	+ 0·5	− 0·3	+ 0·2	+ 1·7	25,770	+ 3·7	+ 2·0
61	22,275	− 8·8	− 6·1	−10·0	−12·3	− 6·8	− 3·5	18,607	+ 2·1	− 1·4
63	31,533	− 5·4	− 3·7	− 5·1	− 6·3	− 4·9	− 4·1	29,032	+ 0·5	+ 0·1
130	21,174	− 4·3	− 3·4	− 3·0	− 3·7	+ 4·3	+ 2·9	19,623	+ 0·5	+ 1·9
131	21,498	+ 4·2	+ 5·1	+ 4·1	+ 3·2	+ 5·4	+ 5·3	21,517	− 1·6	+ 0·1
133	28,749	− 1·4	− 1·1	− 2·0	− 2·6	− 4·6	− 4·5	27,564	−11·5	−13·3
153	19,283	+ 8·1	+ 8·9	+ 8·9	+ 8·2	+ 3·2	+ 2·4	21,215	−10·2	−10·8
155	28,555	+ 5·1	+ 5·9	+ 4·7	+ 4·1	+ 0·2	− 0·3	29,496	− 3·5	−13·5
172	26,718	+ 0·6	+ 0·8	+ 1·5	+ 1·1	+ 3·2	+ 3·6	26,807	− 6·2	− 8·2
178	33,246	− 5·0	− 4·9	− 4·5	− 4·9	+ 0·5	+ 1·5	30,990	− 8·0	− 7·9
182	20,096	+ 1·9	+ 2·0	+ 2·8	+ 2·9	− 1·8	− 7·8	20,777	− 7·2	− 9·9
185	33,105	+ 2·3	+ 2·3	+ 0·7	+ 0·5	− 1·1	− 2·8	32,219	− 8·6	−10·1
203	27,040	+ 5·4	+ 5·2	+ 7·0	+ 6·6	+ 4·8	+ 6·7	29,612	− 5·6	−11·9
215	19,611	+ 5·2	+ 5·3	+ 5·8	+ 5·3	+ 4·8	+ 5·1	20,650	− 2·4	− 4·4
216	25,577	− 0·0	− 1·1	− 0·6	− 0·3	− 3·3	− 4·3	25,394	− 3·4	− 7·7
230	21,724	+ 4·1	+ 3·4	+ 5·0	+ 5·1	+ 1·3	+ 0·3	23,286	− 2·0	− 5·8
244	22,959	− 1·5	− 3·5	− 3·2	− 2·6	− 0·8	− 1·7	21,668	− 1·9	− 5·2
265	24,001	+ 1·4	+ 2·2	+ 2·0	+ 1·3	− 2·4	− 1·3	24,533	− 0·4	− 3·9
296	32,937	− 3·6	− 5·1	− 4·6	− 3·9	− 2·1	− 3·9	31,015	− 7·4	−13·6
306	38,653	− 4·3	− 4·0	− 4·0	− 4·2	− 3·7	− 4·4	36,779	+ 3·9	+ 4·3
312	22,172	+ 4·1	+ 4·0	+ 3·6	+ 3·5	− 1·3	− 3·0	22,850	− 8·5	−13·2
325	22,864	+ 3·1	+ 1·4	+ 3·2	+ 3·5	+ 2·9	+ 2·6	23,671	− 8·1	−11·1
352	28,262	+ 0·7	+ 0·5	− 0·5	− 0·4	− 1·4	− 4·0	27,423	+ 0·8	− 1·3
359	31,302	+ 0·3	+ 1·0	+ 0·0	− 0·9	− 0·4	+ 2·8	30,590	− 3·3	− 7·2
376	40,769	+ 2·4	+ 2·4	+ 1·6	+ 1·3	− 2·7	− 1·3	41,134	− 6·1	− 0·9
393	34,328	−13·9	−13·5	−16·8	−17·6	−12·3	−10·7	27,464	+ 4·2	+ 0·3
396	20,842	+ 4·9	+ 4·4	+ 5·3	+ 4·7	+ 7·0	+11·4	21,893	− 4·9	−10·2
397	20,979	− 0·1	+ 0·4	− 0·8	− 1·4	− 0·1	− 0·0	19,978	+ 3·2	−10·1
419	33,033	− 1·0	+ 0·2	+ 0·7	− 0·2	+ 1·0	+ 1·1	32,925	− 2·8	− 0·1
427	25,619	− 4·9	− 4·2	− 4·6	− 5·2	− 1·3	− 1·5	23,679	− 2·7	−11·5
433	30,871	+ 2·2	+ 2·1	+ 1·3	+ 0·9	− 0·1	+ 0·7	30,588	− 3·2	−13·0
473	23,377	− 0·9	− 0·7	− 0·2	− 0·6	− 1·9	− 2·4	23,208	− 9·5	−11·0
519	24,454	− 0·2	+ 0·6	+ 0·7	+ 0·1	+ 3·3	+ 2·2	24,041	+ 0·3	+ 3·0
546	20,354	+ 3·4	+ 1·9	+ 4·2	+ 4·7	+10·7	+ 9·7	20,963	− 8·1	−12·4
563	23,660	− 5·8	− 7·2	− 5·5	− 5·1	+ 2·4	+ 2·6	21,897	+ 3·5	+ 0·8
569	22,205	+ 2·2	+ 2·2	+ 2·9	+ 2·5	+ 4·5	+ 4·5	22,576	− 6·3	−15·0
573	22,301	+ 6·1	+ 5·5	+ 7·0	+ 7·1	+ 8·9	+ 8·4	23,953	− 5·2	−11·5
599	31,939	− 1·9	− 2·7	− 2·1	− 2·2	− 3·2	− 0·7	31,283	− 5·6	− 8·7
620	31,046	− 4·5	− 4·7	− 4·2	− 4·7	+ 1·6	+ 3·8	28,954	− 8·5	−12·3
626	21,897	+ 3·7	+ 4·2	+ 3·6	+ 2·8	+ 2·3	+ 4·8	22,273	+ 0·3	− 0·2
628	38,655	+ 2·1	+ 1·5	+ 0·9	+ 1·2	+ 1·2	+ 0·4	38,032	− 6·3	− 6·5

Number of district.	Actual population, 1901.	Table II *Contd.*		Table III *Contd.*		Table IV *Contd.*		Table V *Contd.*		
		Errors from the formulæ of § 19 used as in § 22.		Errors from the formulæ of § 19 used as in § 23.		Errors from the formulæ of § 24 when applied to data of 1891-1901.		Errors from the formulæ of § 24 when applied to data of 1881-91.		
		Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (4).	Percentage error by formula (4).	Actual population, 1901.	Percentage error by formula (4).	Percentage error by formula (4).
		Group C.					**Group D.**	**Group C.**		**Group D.**
132	21,046	+ 3·0	+ 4·9	+ 4·7	+ 6·7	+ 7·1	+ 4·4	23,217	− 5·6	− 8·7
233	23,982	+ 5·2	+ 6·2	+ 4·8	+ 6·3	+ 4·1	+ 1·3	26,319	− 0·6	− 4·9
280	26,907	− 1·0	− 3·5	− 3·1	− 3·9	− 6·6	−16·5	27,110	+ 9·1	+10·7
293	23,946	+ 6·5	+ 4·8	+ 5·8	+ 5·1	+ 4·0	− 5·8	26,477	+ 2·3	− 0·5
297	33,624	− 1·5	− 3·6	− 2·2	− 3·3	− 4·1	−12·4	33,739	− 0·1	−17·3
298	23,171	+ 5·0	+ 3·6	+ 5·7	+ 5·8	+ 8·0	+ 8·0	24,451	− 0·7	−10·0
299	20,773	− 4·6	− 8·8	− 0·8	− 2·7	+ 0·9	− 7·8	22,157	− 2·3	−22·5
339	41,978	− 3·3	− 5·3	− 2·2	− 2·5	− 0·6	+ 0·1	41,874	+ 1·2	−25·5
350	23,845	+ 1·4	− 0·4	− 1·3	− 2·2	− 4·1	−12·8	23,114	− 1·1	−31·2
357	25,854	− 1·4	+ 0·7	− 5·2	− 3·5	− 9·1	−13·1	24,078	− 4·2	−10·0
415	21,782	+ 3·8	− 0·2	+ 2·0	+ 1·2	+ 3·0	+ 2·3	21,733	− 4·5	−13·7
423	28,958	+ 6·2	+ 5·9	+ 5.5	+ 6·6	+ 6·7	+ 4·4	31,407	− 1·5	− 8·5
527	20,454	+ 2·7	+ 1·9	+ 3·1	+ 3·4	+ 4·1	− 0·9	21,662	− 0·8	−15·3
532	21,743	+11·7	+13·5	+ 5·9	+ 8·2	− 2·6	−12·9	24,402	+ 1·2	− 3·9
559	34,711	− 1·0	+ 1·5	− 2·8	− 0·7	− 2·6	− 3·2	32,946	− 1·6	− 8·4
581	28,240	− 2·0	− 5·0	+ 0·4	− 0·3	+ 4·4	+ 5·2	28,281	− 3·1	--11·3
600	33,123	− 2·1	− 6·1	− 1·8	− 2·8	0·0	+ 1·3	32,530	+ 2·2	− 6·6
605	21,471	+ 5·1	+ 2·8	+ 1·2	+ 1·4	− 1·8	+ 0·6	21,102	+ 0·3	− 9·0
614	21,118	+ 2·2	+ 1·1	+ 1·5	+ 1·4	+ 1·1	− 5·0	21,722	− 0·5	− 6·0
617	42,271	− 2·4	− 2·3	0·0	+ 1·1	+ 4·7	+ 7·4	42,565	− 0·6	−10·8
625	27,955	+ 2·7	+ 9·1	+ 1·3	+ 7·0	+ 4·5	+10·4	27,861	− 1·8	− 5·2
627	42,653	+ 7·7	+ 5·4	+ 1·9	+ 1·1	− 2·9	− 5·8	40,712	− 1·1	− 5·5
43	27,196	− 5·4	− 6·6	− 9·4	− 8·4	−11·3		23,876	+ 4·1	
59	26,422	+ 1·4	+ 3·5	− 1·2	+ 1·9	0·0		25,770	+ 1·5	
61	22,275	− 3·7	+ 2·8	− 9·8	− 3·5	−10·4		18,607	− 2·5	
63	31,533	− 4·8	+ 0·2	− 6·5	− 2·6	− 5·8		29,032	− 0·3	
130	21,174	− 3·8	− 0·9	− 3·0	− 0·3	+ 2·8		19,623	− 3·3	
131	21,498	− 4·8	+ 8·2	− 1·6	+ 6·3	+ 4·8		21,517	− 1·8	
133	28,749	− 2·4	− 0·1	− 4·2	− 1·6	− 3·9		27,564	− 9·2	
153	19,283	+ 3·4	+ 7·0	+ 4·3	+ 7·1	+ 4·8		21,215	− 5·8	
155	28,555	+ 4·3	+ 7·2	+ 2·5	+ 4·9	+ 1·2		29,496	− 3·5	
172	26,718	− 1·6	− 0·4	− 0·6	+ 1·3	+ 2·5		26,807	− 3·3	
178	33,246	− 5·7	− 4·5	− 5·2	− 3·4	− 1·2		30,990	− 7·7	
182	20·096	− 1·7	− 1·2	+ 0·1	+ 0·2	+ 1·1		20,777	− 4·3	
185	33,105	+ 4·3	+ 5·3	+ 1·1	+ 2·3	− 0·3		32,219	− 5·8	
203	27,040	− 1·3	− 0·1	+ 2·1	+ 3·9	+ 5·9		29,612	− 2·7	
215	19,611	+ 3·4	+ 3.9	+ 3·4	+ 4·9	+ 4·3		20,650	− 2·7	
216	25,577	− 2·1	− 4·6	− 2·6	− 2·8	− 2·2		25,394	− 1·4	
230	21,724	− 2·2	− 3·1	+ 0·5	+ 1·1	+ 2·9		23,286	− 0·8	
244	22,959	0·0	− 4·7	− 2·1	− 3·4	− 1·5		21,668	− 1·9	
265	24,001	− 1·5	+ 1·2	− 1·6	+ 1·1	− 2·2		24,533	+ 0·4	
296	32,937	− 2·9	− 6·9	− 3·4	− 4·9	− 1·9		31,015	− 7·0	

Number of district.	Actual population, 1901.	TABLE II *Contd.*		TABLE III *Contd.*		TABLE IV *Contd.*	TABLE V *Contd.*	
		Errors from the formulæ of § 19 used as in § 22.		Errors from the formulæ of § 19 used as in § 23.		Errors from the formulæ of § 24 when applied to data of 1891-1901.	Errors from the formulæ of § 24 when applied to data of 1881-91.	
		Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (3).	Percentage error by formula (4).	Percentage error by formula (4).	Actual population, 1901.	Percentage error by formula (4).
					Group C.			
306	38,653	− 4·6	− 3·7	− 4·6	− 8 8	− 4·2	36,779	+ 1·1
312	22,172	+ 1·7	+ 2·5	+ 0·9	+ 2·2	+ 0·3	22,850	− 5·1
325	22,864	− 1·1	− 5·0	− 4·5	− 0·1	+ 8·4	23,671	− 6·2
352	28,262	+ 2·0	+ 1·9	+ 0·0	+ 0·2	− 1·2	27,423	+ 0·8
359	31,302	+ 0·4	+ 2·8	− 1·8	+ 1·3	− 1·8	30,590	− 2·0
376	40.769	+ 1·0	+ 2·1	− 0·9	+ 1·1	− 1·4	41,134	− 1·1
393	34,328	− 6·6	− 5·4	−13.1	−11·0	−16·4	27,464	+ 3·6
396	20,842	− 2·2	+ 1·9	− 0·1	+ 4·6	+ 4·8	21,893	− 1·7
397	20,979	+ 1·5	+ 3·4	− 1·2	+ 1·2	− 1·0	19,978	− 1·7
419	33,033	− 3·8	+ 0·1	− 2·4	+ 0·8	+ 1·5	32,925	− 0·2
427	25,619	− 3·8	− 1·9	− 4·7	− 2·7	− 2·9	23,679	− 5·1
433	30,871	+ 2·5	+ 3·1	+ 0·1	+ 1·9	+ 0·1	30,588	− 3·2
473	23,377	− 3·8	− 3·3	− 3·1	− 1·8	− 1·7	23,208	− 3·9
519	24,454	− 0·8	+ 1·7	− 0·1	+ 1·7	+ 1·9	24,041	− 0·7
546	20,354	+ 1·5	− 2·4	+ 4·1	+ 3·1	+ 6·3	20,963	− 5·8
563	23,660	− 6·1	− 9·6	− 4·8	− 5·8	− 0·4	21,897	+ 1·9
569	22,205	− 0·1	+ 0·6	+ 0·8	+ 2·5	+ 3·6	22,576	− 4·6
573	22,301	+ 2·3	+ 1·4	+ 4·8	+ 5·1	+ 4·9	23,953	− 3·8
599	31,939	− 4·0	− 5·5	− 4·0	− 3·6	− 3·9	31,283	− 5·6
620	31,046	− 3·3	− 3·8	− 4·0	− 2·6	− 1·2	28,954	− 6·2
626	21,897	+ 3·4	+ 5·0	+ 1·4	+ 4·2	+ 1·4	22,273	− 0·4
628	38,655	+ 4·1	+ 4·4	+ 2·3	+ 2·8	+ 2·3	38,032	− 5·7

TABLE VI.—*Errors in Example* II.

Number of district.	Actual population, 1901.	Percentage error by Registrar-General's method.	Percentage error by constant house rate.	Percentage error by formula (i).	Percentage error by formula (iii).	Percentage error by formula (i).	Percentage error by formula (iii).
				Group α.		**Group γ.**	
38	194,429	− 4·3	+ 3·9	− 0·7	+ 0·5	+ 1·2	− 0·5
40	49,493	+ 1·0	+ 3·3	+ 0·8	+ 2·3	+ 2·2	− 2·0
42	96,051	−13·1	− 4·3	− 8·6	− 7·5	− 6·5	− 8·7
50	49,086	+ 4·8	+ 5·1	+ 4·8	+ 5·6	+ 5·2	+ 1·9
62	68,461	− 4·4	+ 5·0	+ 2·8	+ 4·5	+ 4·3	+ 0·6
64	48,942	− 9·7	+ 3·2	− 0·1	+ 1·1	+ 1·3	− 2·4
65	52,134	− 7·2	+ 0·8	− 3·8	− 2·4	− 2·2	− 6·2
88	188,138	+ 1·8	+ 4·1	+ 1·1	+ 1·7	+ 2·5	+ 2·4
91	82,418	+ 2·6	+ 6·9	+ 6·2	+ 6·6	+ 7·0	+ 5·5
97	61,319	− 4·7	− 3·9	− 4·4	− 4·9	− 4·0	− 5·1
137	53,936	−14·7	+ 6·0	+ 1·9	+ 4·9	+ 4·3	− 1·5
160	89,335	+ 6·4	+ 5·6	+ 3·7	+ 3·7	+ 4·9	+ 4·2
264	42,926	−28·0	− 6·8	− 9·2	− 7·6	− 7·8	−13·1
273	80,312	+ 5·4	+ 9·2	+ 8·2	+ 8·9	+ 8·9	+ 6·9
317	77,604	+ 3·8	+ 7·6	+ 6·2	+ 6·8	+ 6·7	+ 5·1
327	58,734	− 5·5	+ 3·5	+ 2·0	+ 3·2	+ 3·4	+ 1·8
335	57,882	− 5·9	+ 3·2	+ 3·1	+ 3·8	+ 3·7	+ 0·8
351	49,440	− 1·7	+ 2·8	+ 3·0	+ 8·3	+ 3·3	+ 0·7
371	172,743	− 4·0	+ 4·0	+ 2·8	+ 2·2	+ 3·9	+ 4·6
385	187,087	−16·6	+ 5·1	+ 0·8	+ 2·9	+ 3·7	+ 1·3
445	79,595	− 8·0	+ 4·7	+ 3·3	+ 4·6	+ 4·9	− 0·3
454	136,230	+ 3·6	+ 3·1	+ 2·1	+ 1·6	+ 2·7	+ 2·9
457	108,594	+ 6·8	+ 6·2	+ 4·3	+ 4·7	+ 5·4	+ 4·3
461	257,387	+ 2·5	+ 4·2	+ 3·0	+ 2·9	+ 4·3	+ 4·6
463	114,773	+ 0·5	+ 6·6	+ 4·1	+ 5·3	+ 5·9	+ 3·9
464	342,643	+ 0·8	+ 3·7	+ 2·3	+ 2·4	+ 3·6	+ 3·8
465	229,450	+ 0·2	+ 0·9	− 0·3	− 0·7	+ 0·7	+ 1·3
474	223,520	+ 5·5	+ 4·9	+ 4·2	+ 4·1	+ 5·2	+ 5·3
475	63,001	+ 0·1	+ 3·3	+ 2·3	+ 2·6	+ 3·4	+ 1·8
476	152,231	+ 4·6	+ 3·0	+ 2·4	+ 2·2	+ 3·1	+ 3·0
477	93,697	−29·2	+ 2·6	− 1·4	+ 2·4	+ 2·0	− 3·9
479	67,385	− 5·4	+ 6·5	+ 2·4	+ 4·7	+ 4·5	+ 0·0
507	70,326	− 6·5	+ 3·8	+ 1·8	+ 2·3	+ 3·3	+ 1·6
516	92,012	− 5·7	+ 3·9	+ 2·9	+ 3·4	+ 4·1	+ 2·7
572	62,861	− 7·9	+ 4·4	+ 3·1	+ 3·9	+ 4·3	+ 1·8
579	43,480	+10·4	+ 7·3	+ 7·3	+ 7·0	+ 7·5	+ 5·9
583	81,820	− 9·5	+ 1·2	− 2·9	− 3·2	− 1·2	− 1·4

TABLE VI *Contd.—Errors in Example* II.

Number of district.	Actual Population, 1901.	Percentage error by Registrar-General's method.	Per-centage error by constant house rate.	Per-centage error by formula (i).	Per-centage error by formula (iii).	Per-centage error by formula (i).	Per-centage error by formula (iii).
				Group β.		**Group γ.**	
39	137,716	−5·4	+3·3	+2·1	−0·7	+1·1	−0·6
44	40,336	+9·4	+4·8	+5·9	+0·9	+4·3	+2·4
46	97,415	−8·3	+4·5	+3·5	−0·4	+2·5	+0·1
98	80,611	−30·8	+0·3	+1·7	−4·9	+0·3	−2·7
126	178,866	−8·0	−0·2	−2·3	−4·0	−3·1	−4·3
189	95,455	−49·9	−0·4	−1·4	−10·3	−3·0	−9·2
241	59,285	+0·4	+10·4	+10·1	+6·0	+8·8	+6·6
367	92,814	+1·5	+3·9	+4·5	+4·3	+3·6	+4·1
370	47,636	−4·8	+0·7	+2·0	−1·1	+0·5	−0·3
372	118,607	−1·0	+4·5	+4·3	+4·2	+3·5	+3·8
373	172,189	−7·1	+5·5	+5·2	+5·0	+4·5	+4·4
374	152,127	−3·6	+2·8	+3·2	+6·3	+2·7	+5·3
375	92,482	−6·3	+1·9	+2·7	+3·4	+1·9	+3·0
387	312,263	−0·3	+4·7	+3·7	+5·0	+2·7	+4·1
424	96,626	−5·5	+3·7	+5·5	+3·3	+4·7	+3·4
428	39,240	−16·1	+0·3	+2·2	−4·5	+0·4	−2·7
429	81,618	−17·4	+0·6	+1·3	−1·5	0·0	−1·5
447	54,735	+4·1	+3·6	+4·9	+3·6	+3·7	+4·0
455	529,684	+1·1	+2·2	+0·9	+2·5	+0·5	+1·5
456	153,648	+7·3	+3·5	+2·7	+4·5	+2·1	+3·8
458	191,239	+2·3	+1·1	+0·4	+3·4	−0·1	+2·2
460	86,254	+0·6	+0·6	+1·1	−0·1	+0·1	−0·9
481	42,793	+3·7	+5·2	+6·8	+2·6	+5·6	+4·3
504	70,258	−6·3	+2·4	+2·8	+1·3	+1·6	+1·3
506	113,518	+0·4	+3·6	+3·7	+5·1	+2·8	+4·3
533	43,420	−16·6	+2·8	+4·7	+0·5	+3·2	−0·4
534	139,773	+9·4	+7·3	+5·2	+5·2	+4·5	+4·8
542	56,209	−8·3	+6·1	+7·0	+2·6	+5·8	+3·7
544	88,234	−3·1	+6·6	+3·2	+1·0	+2·1	+1·0
545	94,542	+1·0	+3·1	+4·5	+5·5	+3·0	+4·9
548	83,557	−13·2	+2·3	+1·1	−0·4	−0·0	−0·5
549	74,252	+1·9	+3·0	+1·7	+1·9	+0·8	+1·9
550	50,725	+0·7	+0·1	+0·6	−0·3	−0·7	+0·1
551	40,847	+3·1	+0·8	+2·3	+0·2	+0·8	+1·2
562	55,744	−12·5	+0·8	+0·6	−4·1	−0·9	−3·1
574	69,536	+20·5	+4·3	+5·3	+6·3	+4·6	+6·3
575	55,542	+3·0	+4·4	+5·7	+5·2	+4·8	+5·7
587	204,824	−1·2	+6·7	+0·7	+1·2	−0·1	+0·2
592	119,746	+11·4	+5·7	+6·4	+6·7	+0·7	+6·3

TABLE VII.—*Errors in Example* III.

Name of parish.	Actual population, 1891.	Percentage error by Registrar-General's method.	Percentage error by constant house rate.	Percentage error by formula (i).	Percentage error by formula (ii).
Group H.					
Charlton	11,742	−17·6	− 0·3	+ 0·9	− 4·8
Clapham	43,698	+ 9·3	+ 3·8	+ 4·1	+ 2·3
Eltham	5,682	+ 7·3	+ 5·7	+ 8·9	+ 1·1
Lee	16,381	+12·3	+ 8·2	+ 9·1	+ 6·4
Lewisham	72,272	− 2·2	+ 5·4	+ 7·4	+ 4·9
Penge	20,375	+16·8	+ 7·1	+ 7·4	+ 1·0
Plumstead	52,436	−35·0	+ 1·1	+ 5·3	− 1·2
Putney	17,771	− 2·7	+ 3·9	+ 5·6	+ 6·3
Stoke Newington	30,936	+14·8	− 0·9	− 0·2	− 1·5
Streatham	42,972	−36·1	+ 2·6	+ 4·8	+ 5·1
Tooting Graveney	5,784	− 2·4	+ 3·3	+10·5	+ 1·2
Wandsworth	46,717	−26·9	+ 2·3	+ 2·1	+ 0·3
Group J.					
Battersea	150,558	+ 7·7	+ 1·3	+ 3·5	+ 2·9
Bow	40,365	+17·4	+ 1·7	+ 5·9	+13·8
Camberwell	235,344	+11·5	− 1·8	+ 1·0	+ 3·2
Deptford (St. Nicholas)	6,887	+27·3	− 3·6	+ 1·7	+28·7
Deptford (St. Paul's)	101 286	+ 0·1	− 1·7	+ 2·8	+ 7·2
Fulham	91,639	−44·4	+ 3·2	+ 6·4	+12·4
Greenwich	57,240	− 6·8	+ 0·9	+ 6·9	+11·6
Hackney	198,606	+ 7·9	− 2 2	+ 0·4	+ 3·4
Hammersmith	97,239	+ 5·4	− 1·4	+ 3·0	+ 3·5
Hampstead	68,416	−14·9	+ 7·1	+ 8·5	− 3·5
Horsleydown	9,812	−31·3	−33·1	− 7·7	+11·5
Lambeth	275,203	+ 9·4	+ 0·3	+ 1·5	− 2·1
Limehouse	32,202	+ 7·2	− 2·8	+ 2·5	+ 9·8
Mile End Old Town	107,592	+10·1	− 1·7	− 0·0	+ 1·5
Rotherhithe	39,255	+14·0	− 0·8	+ 3·7	+11·6
St. Saviour's, Southwark	13,913	+ 4·4	−33·9	−16·2	−15·7
Shadwell	8,123	+ 1·4	−57·8	−22·0	+ 8·8

Table VII *Contd.—Errors in Example* III.

Name of parish.	Actual population, 1891.	Percentage error by Registrar-General's method.	Percentage error by constant house rate.	Percentage error by formula (i).	Percentage error by formula (ii).
			Group K.		
Bermondsey	84,682	+10·3	+ 2·9	+ 3·3	+ 3·4
Bethnal Green	129,132	+ 5·0	− 2·1	− 1·9	− 1·9
Bromley	70,000	+20·7	+ 0·7	+ 3·1	+ 3·2
Chelsea	96,253	+10·2	+ 0·8	+ 3·0	+ 2·9
Islington	319,143	+10·7	− 1·4	+ 0·2	+ 0·2
Kensington	166,308	+20·5	+ 6·9	+ 8·5	+ 8·5
Mile End New Town	11,303	− 8·6	−18·5	−17·7	−16·1
Newington	115,804	+10·2	−13·7	−14·9	−14·8
Paddington	117,846	+ 1·1	− 0·5	+ 2·1	+ 1·3
Poplar	56,383	+ 9·8	+ 0·1	+ 1·2	+ 1·4
Ratcliff	14,928	+ 8·6	− 5·6	− 7·3	− 6·6
St. George's-in-the-East	45,795	+ 2·6	− 6·0	− 6·9	− 6·9
St. George's, Hanover Square	78,364	+13·4	+ 9·6	+ 9·2	+ 9·1
St. George's, Southwark	59,712	+ 4·0	+ 0·9	+ 1·7	+ 1·7
Shoreditch	124,009	+ 3·1	− 7·8	− 9·1	− 9·2
Whitechapel	32,326	−19·9	−12·9	−12·5	−11·7
Woolwich	40,848	− 6·4	− 2·3	+ 0·5	+ 0·6
			Group L.		
Christchurch (Southwark)	13,264	− 2·4	− 4·7	+ 2·1	− 1·2
Christchurch (Spitalfields)	22,859	− 2·7	−10·4	− 4·4	− 7·3
Clerkenwell	66,216	+10·4	− 7·8	−11·1	−11·0
St. Andrew and St. George	26,228	− 6·4	+14·5	+18·7	+17·4
St. Anne, Westminster	12,317	+22·6	+ 0·1	+ 8·6	+ 6·0
St. Clement Danes	8,492	+ 7·7	− 4·7	+ 5·6	+ 2·7
St. Giles and St. George	39,782	− 5·8	+ 6·7	+ 8·5	+ 7·9
St. James, Westminster	24,995	+ 6·3	+ 2·7	+ 1·5	+ 1·7
St. Luke	42,440	− 7·9	−10·1	−16·2	−15·9
St. Margaret and St. John	55,539	− 1·6	− 3·0	− 5·3	− 4·4
St. Martin-in-the-Fields	14,616	− 4·4	+ 2·9	+ 6·0	+ 7·6
St. Marylebone	142,404	+ 7·0	+ 4·2	+ 3·4	+ 3·7
St. Pancras	234,379	+ 8·2	− 0·2	− 1·2	− 0·0

Discussion *on* Mr. Snow's Paper.

Mr. Yule, in moving a vote of thanks to Mr. Snow, said he had great pleasure in opening the discussion on the Paper as it dealt with an exceedingly important subject, and one which had often been under the consideration of the Society, by a method which in all essentials was a new one. Most of the methods that had been practically used before had been methods coming under Mr. Snow's class A, namely, methods based on pure hypothesis. Anyone who had had much experience of such methods, and had checked them in the way Mr. Snow had checked his own method, against actual increase of population during an inter-censal period, must have arrived at the conclusion that they were exceedingly untrustworthy. One had only to sketch out the curves of growth of a number of districts during the last century from the census data to see how imperfectly the hypothesis of the geometric law of growth applied, and, indeed, how impossible it must be to make use of any assumption as to any law of growth. If, for example, one took the rural districts or counties, the curve of growth in a number of cases did not rise uniformly, but fluctuated up and down in quite an irregular way, the emigration being marked in certain decades and in others not so marked. As a pure hypothesis it would probably be better to make use not of any geometric law of growth, but of the ordinary method of differences. But so far as his own experience went, errors would be made even by that method that were quite comparable with the errors made by the assumption of the geometric law of growth. It worked out slightly better than the Registrar-General's method, but one was still liable to make very large errors, especially in cases like the district of Romford where the growth suddenly swooped up. No pure hypothesis, he was certain, could lead to very much better results than the methods adopted by the Registrar-General; it might be possible to introduce slight improvements, but not marked improvements. In order to introduce marked improvements he was sure that progress must be made on the general lines indicated by Mr. Snow, that is to say they must drop hypothesis, and they must look to the symptoms of changing populations—changes in the number of births, the number of deaths, the number of marriages and the number of houses. Although Mr. Snow's method might look complicated to some readers, it was essentially quite simple. One wanted to form equations by means of which the changes of population might be estimated from the changes in these symptoms. To do that one would take an inter-censal decade that had already been completed, and form equations from the given data. One then assumed that those equations would hold good in the following decade, and applied them accordingly. Mr. Snow had tested his hypothesis by applying them to a completed decade following that on which they were based, and had found that the assumption was a perfectly justifiable one. Any criticism of Mr. Snow's method, he felt, must be on quite minor points. Indeed, on several points he would rather ask questions than make criticisms. His principal question was one that he thought someone was bound to ask. Mr. Snow had only shown them in the Paper how to estimate the populations at the date of the next following census; but for practical purposes what one wanted to do was to estimate the populations during the intervening inter-censal period. If Mr. Snow could indicate at all what procedure he intended to use, even in general terms, it would be of interest, for after all the practical applicability of the method turned very largely on the way in which it could be applied to such inter-censal populations. The amount of arithmetic involved in forming the equations was considerable, but if once formed they could be applied to all the inter-censal years, it would be well worth doing. If, however, one wanted different estimating equations for every inter-censal year, it would become rather a serious matter. There was one other point he would like to touch on, and that was the method of measuring errors. The estimate given by the equations, it should be noted, was such that the root-mean-square of the absolute errors was made a minimum, not the root-mean-square of the percentage errors measured with respect to the estimated population. It was in consequence of this, he thought, that a few results were obtained which looked a little paradoxical at first sight; for example the addition of the second or third variable not only might not increase the accuracy of the estimate, but might actually decrease it. If it were desired to make a minimum of the root-mean-square error measured in the fashion in which Mr. Snow measured it—and he thought that method was correct, for it would tend to make a minimum in the errors in the quantities like death rates—might it not be better to change one's whole procedure, even though this would add to the already very lengthy arithmetic? The percentage error with respect to the estimated population was equivalent to the percentage error of the reciprocal of the actual population. Might it not then be better to estimate, not the absolute change in the population, but the percentage change in the reciprocal of the population? The arithmetic would be long, and he did not believe it would lead to results of very appreciably greater accuracy than those obtained by Mr. Snow, but it might obviate the paradoxical manner in which the estimates were not improved by introducing additional variables. He thought the Society were greatly indebted to Mr. Snow for the large amount of labour he had bestowed upon the Paper. Any method such as that which he proposed could only be tested statistically on large groups of districts and the examples he had given served to illustrate the method in the fullest manner. He had very much pleasure in proposing a hearty vote of thanks to Mr. Snow for presenting the Paper to the Society.

Mr. NOEL A. HUMPHREYS, in seconding the vote of thanks, expressed his admiration of the ingenious suggestions proposed for more accurately estimating population in post-censal years. He did not feel competent to appreciate fully the mathematical methods adopted, but at the same time he appreciated to the full extent the amount of work bestowed upon the Paper. Population being the natural basis of all national and local statistics, it was of course impossible to over-estimate the importance of some trustworthy system for approximately estimating local populations from year to year. It was obvious that a more frequent census was the only true and practical remedy for the present unsatisfactory method of estimating local populations. The system adopted by the Registrar-General for estimating population was fairly accurate for the whole country, but was most unsatisfactory for local areas. Failing more frequent censuses, however, it seemed improbable that the author's scientific formulæ of multiple correlation could be at all generally adopted by Registrars-General or Medical Officers of Health. The Paper endorsed the undoubted fact that local returns of inhabited houses afforded the most trustworthy data for approximately estimating the increase or decrease of local population in post-censal years. It was also a fact that, notwithstanding the difficulties that surrounded the definition of a house, the proportion of persons to a house showed, within the same areas, but slight alteration in successive censuses. It should therefore be possible to secure more uniformity in local returns of inhabited houses on the rate-books, and to provide for annual returns therefrom as a basis for the estimation of local populations. Moreover, as they knew that the number of marriages, births and deaths were largely influenced by factors quite apart from the increase or decrease of population, he did not feel himself at present able to agree that the increase or decrease in these numbers could be usefully employed in estimating the population to be used in calculating the ratio of marriages, births and deaths. It seemed to him that returns of inhabited houses from properly constructed rate-books would form by far the most valuable aid in the estimation of post-censal local populations, and would obviate the serious errors in the official estimates of urban populations disclosed at each successive decennial census.

Dr. STEVENSON said he wished to support the vote of thanks to Mr. Snow for his valuable Paper. Several of the remarks that he had proposed to make upon it had been very largely anticipated by what Mr. Humphreys had just said. He would like to draw attention to a difficulty, from the point of view of the Registrar-General, in the adoption of such methods of estimation as had been quite properly pointed out as the more accurate ones, namely, those that took advantage of local inter-censal data that would be obtained from the localities from year to year. He was greatly struck in Mr. Snow's Paper by the good showing of the results obtained from inhabited houses, and he thought that for the purposes of local reports, and so forth, probably the best estimates could be obtained from such data, but for the Registrar-General's purposes the method must be consistent in its application. It was desirable to have a method which, when applied to different portions of the country, gave results which would amount to the same grand total as was obtained when the method was applied to the whole country.

This, it seemed to him, could not be hoped for from any of the methods which took into account local sources of information in inter-censal periods. He agreed with what Mr. Humphreys had said as to the hopefulness of the rate-book method of estimation for local purposes. The objections that had been urged against it he believed were largely due to compounding for rates, which, he presumed, meant that the owner of property paid a certain fixed annual sum whether his houses were let or empty. It seemed to him that the Medical Officer of Health might anticipate such difficulties by taking, at the time of the census, a small census on his own account of the number of such houses as were actually unoccupied in cases where he found from inspection of the rate-books that this compounding system was in operation. Similarly he might deal with cases where rates were paid on a block of flats or model dwellings as a whole, and not on individual dwellings in the block. There were certain reasons why the method referred to in the Paper in connection with the name of Mr. Waters should be preferred to that at present in use. By the method at present in use it was possible that in the case of a district where the population had been declining slowly during the last completed inter-censal period an estimate of a small increase since the last census could be arrived at. Mr. Waters' method obviated that difficulty, and was to be preferred for that amongst other reasons.

Dr. LONGSTAFF said he was struck on the present occasion by the huge advance that statistics had made since he had read a Paper before the Society, now some fifteen or sixteen years ago, on a similar subject to the present one. He had then shown, with regard to the census of 1891, that by taking account of the births and deaths, and also of the emigration and migration (which had up to that time been entirely neglected by the Registrar-General's department), it was possible to make an extremely close estimate of the population of the whole United Kingdom. The official estimate of the population of the United Kingdom at the time of the census of 1891 was in error + 2 per cent. His own estimate was 0·2 per cent., though he forgot whether it was plus or minus, which showed how very much closer one could get to the population of the United Kingdom by taking migration into account. He thought that the returns of emigration and migration were more complete now than they were in those days. It seemed to him that one had to approach this question by a method of successive approximations. He quite saw the difficulty from Dr. Stevenson's point of view, but if it were true that they could know within a very small amount, by taking careful account of the migration and emigration, what the population of the United Kingdom was in any given year they might therefore know what was the death-rate for the United Kingdom and what was the birth-rate with approximate accuracy, and it seemed to him that knowing those it might be possible to load their figures. It seemed to him that they might get a better result. If they loaded the deaths or the marriages in accordance with the result which had been obtained, a result which they might assume to be very near the truth, they would know whether the death-rate or the marriage-rate was rising or falling abnormally in the country. For the purposes of local officers, medical officers of health, corporations, and so on, it might be possible to proceed in a somewhat similar manner by taking much larger units than their own district, and arriving at conclusions as to the county or the registration division, or any other convenient unit, so as to get over the very great irregularities in the growth of towns. A method might be obtained of loading, so to say, the marriage-rate or the birth-rate for the particular portion of the United Kingdom in which the district in question was situated. By taking that into consideration it might be possible to get over some of the great difficulties that presented themselves. Of course the fundamental difficulty associated with forming local estimates was in the very great difference between municipal units. One municipal unit was the ancient city, which had remained with the same boundaries for a very long time and which at one time comprised the entire population, but now the population had overflowed vastly in one direction or in several directions. It seemed to him that those estimates could only be dealt with by the local man who had loaded his elements in forming his estimate. He did not believe that any results of value could be obtained from grouping together a heterogeneous class of districts. It was very useful to do it to prove one's formula, but obviously the true method must be to treat each district on its own merits. He was afraid that it was quite beyond him to criticise the Paper in detail, but it struck him that something on the general lines that he had foreshadowed might be some use in the future.

Dr. DAVID HERON said that first of all he must confess that he did not attach so much importance as Dr. Stevenson did to the condition that the sum of the estimates for the individual districts should be equal to the estimate for the whole country. If there was anything in it, and he was not convinced that there was, the objection could easily be overcome by multiplying the estimates for the individual districts by a factor,

$$\frac{\text{Estimate for whole country}}{\text{Sum of estimates for individual districts}},$$

which would be found to be very nearly equal to unity, and that would get over the whole difficulty. There were two suggestions that he would like to make: the first was that in publishing the results of the recent census there should be given a table showing for every registration district the actual population together with the estimated population as found by the official methods, together with examples of some of the more striking errors made in the birth-, marriage- and death-rates by the use of these defective estimates. Such a table would, he felt sure, do far more than a dozen deputations to help on the movement in favour of more frequent censuses. The second point he wished to make was that it was desirable that in giving such estimates some indication should be given of the degree of accuracy that might be expected. This could of course be most easily done by giving the estimates to the nearest 1,000 or 10,000. There could be no object in estimating populations to the nearest unit when, as they had seen, the estimates might be wrong to the extent of 50 per cent.

Mr. GREENWOOD wished to ask whether the method proposed might not be theoretically more accurate than appeared from the illustrations. If any of the regressions involved were markedly skew then a linear relation would not yield the best possible results. He would like to ask Mr. Snow whether the regressions were in fact linear. The determination of a suitable formula, in the case of marked skewness, would involve an enormous amount of arithmetical labour, but might conceivably be worth doing if it could be done once for all.

Sir ATHELSTANE BAINES joined in the expression of thanks to the author of the Paper for the new way in which he had treated his difficult subject. His own experience in intercensal estimates had lain exclusively in the comparatively easy field of large aggregates, in dealing with which, after trying most of the methods in vogue, he had found that the use of differences, especially in connection with ratios, gave results as accurate as were required for practical purposes. The main difficulty, however, arose in dealing with smaller aggregates, such as those of 40,000 to 50,000 inhabitants, which were perhaps the most important in this country in connection with these estimates, and in which the want of accurate computation was most felt. The method advocated by Dr. Stevenson was to adapt the local figures to the general rate, not to build up the latter from the former. This plan was no doubt very convenient, but he was inclined to favour the more elaborate method of including the factors mentioned by Mr. Snow, in view of the number and influence of special features in many of the units, which could only be appraised by local knowledge. Of some such cases he gave instances. It was clear from these that the absence of information about internal migration was a great want in such questions, and in this respect Belgium and Sweden, for example, possessed much better means of record. The main point brought out by the Paper, then, seemed to him to be the necessity of the check of the quinquennial census, so long and so keenly advocated by the Society.

Dr. BUTLER (Medical Officer of Health for Willesden) said he desired to refer to a method he had employed to obviate the anomalies which arose from assuming that the number of houses for a given area on the rate-books was the same as the number of houses for that area considered as a datum for the estimation of population. Apart from those which had been referred to, which were incidental to the system of compounding, rate-books were kept with no regard to local boundaries other than those required for rating purposes, and ward populations estimated on this basis were even more fallacious than those of a complete rating area. He had found it possible, however, without dislocation of the ordinary work, twice a year to direct an actual enumeration of all the houses in his own district, the return showing the total number of houses in each street, the number occupied, and approximately the number of empty tenements of one, two, three, or more rooms. Such a datum was accurate and invaluable. Its usefulness, however, depended upon another factor—the average number of persons per house which, like the other data proposed by the writer of the Paper to be employed, was subject to fluctuations in an inter-censal period. This degradation of the data was inevitable in a decennial inter-censal period. The number of persons per inhabited house varied with the social class, the age and type of house, and other factors which changed materially in an inter-censal period. The rapid decline in the birth-rate and death-rate (in his own district from 35 to 26 and from 14 to 10 respectively in a decennium) could only partially be compensated by an increase such as in that of the marriage-rate, in any method based on the correlation of these data. Nevertheless, the method suggested by Mr. Snow offered a prospect of estimating local populations more accurately than any at present in use.

Mr. SNOW, in reply, thanked those taking part in the discussion for their appreciation of the Paper. It was not written in the first place for reading before the Society, and he was conscious of the difficulty of obtaining an adequate idea of the method from a single perusal of the Paper. But he thought it had served its purpose in bringing before those interested the possibility of obtaining more trustworthy estimates of population than could be reached by the methods at present in vogue. The misfortune of having to use estimates at all was brought home sooner or later to all who used population statistics. Some years ago Mr. Yule pointed out the difficulty of interpreting the figures of pauperism, on account of the uncertainty of the sizes of the actual populations dealt with, while it was the desirability of obtaining more trustworthy data in work connected with eugenics that led him—through a suggestion of Dr. Heron—to attempt to obtain estimates on an entirely new basis. Mr. Yule had raised the question of the estimation of the population for dates other than the census day. There were two ways of attempting this. The formulæ might be modified according to the number of years which had elapsed since the last census, the figures of births, &c., being altered proportionally; or the formulæ might remain unchanged, but the *estimated* population for ten years previous used as the datum line. The latter could be obtained with fair accuracy when the results of the censuses on either side of it were used. If he were calculating the population for, say, five years after a census, he would use the second of the methods mentioned, but more experience might point out a better way. The formula worked out after a census would be available, with simple modifications, until the next. He was unable to follow Mr. Yule's remarks with regard to the mode of measuring the percentage errors, but he would ask for elucidation elsewhere. He was unable to agree with Mr. Yule's statement that it was paradoxical that the addition of an extra variable had not, in some cases, improved the estimates, seeing that the estimating equations applied to a decade other than that on which they were founded.

Mr. YULE remarked that he thought it was really due to the way of measuring the errors.

Mr. SNOW said that was one reason, but it was not the only one. He agreed with Mr. Humphreys that the figures of houses gave far and away the most valuable single source of information which could be used, but the distinction between an inhabited and a rated house presented a real difficulty. If they got the actual figures of *rated* houses from the census they could use rated houses afterwards. Dr. Stevenson had referred to this in the latest Annual Report of the Registrar-General (1909). Even then there was the difficulty which arose from the changing of the character of the district. He knew of a district in which not a single house had been built for ten or twelve years, but the local authorities were actually wanting more school room, merely from the fact that houses which used to accommodate one family were now inhabited by two. Both Dr. Stevenson and Dr. Heron had raised the point of getting the sum of the estimates of the individual districts to total to the *estimate* for the whole country. He felt that too much stress was laid on the necessity for this. More could be said for it if they were trying to get the sum of the estimates of the separate areas to total to the *actual* population of the whole country. Taking the 103 districts he had used in Example I, and adding the results, he found that the Registrar-General's total was below the actual total by 155,000, while his own formula (3) (applied as in § 23) made the total too large, but only by 45,000. Yet he had paid no regard to getting the total to come right. He thought that the figures of emigration and immigration were sufficiently trustworthy now to be used in computing the population of the whole country. Using these figures, Mr. Burnett-Hurst and Mr. Horwitz, in the latest number of the *Economic Journal*, had come to the conclusion that the official estimate at the time of the census would be in excess of the enumerated population by some 500,000. Some rough calculations of his own pointed to a similar conclusion. If these calculations were right, the birth and other rates would, of course, be affected. These rates were no doubt falling, but he did not believe they were diminishing so rapidly as the official publications stated. Dr. Longstaff had suggested a method of loading the numbers of marriages and births according to the movements of the marriage and birth rates in the whole country. He (Mr. Snow) had actually tried a similar idea, but after spending some time on it had given it up on account of the great arithmetical labour involved. In reply to Dr. Greenwood's question, the regressions were far from being linear, and he had attempted to allow for that fact. Again, however, the arithmetic imposed great obstacles, and he had given it up. Sir Athelstane Baines had raised some very interesting points about the reasons for the large errors in the estimates. A similar case to those he had mentioned was that of Golder's Green and Hendon, where on account of the Tube Railway a new district was opened up. The same thing was noticeable on other sides of London.

Sir ATHELSTANE BAINES asked if this did not re-act on the birth and death rates? Was it not a permanent migration?

Mr. SNOW said that could be ascertained to some extent from the figures of births, marriages, and deaths, but he did not think it could be done completely. The numbers of births, marriages, and deaths lagged behind those of population. Taking the case of the Romford district, which had increased by some 50,000 in ten years, the figures of births, marriages, and deaths gave some indication of the change, but not completely. Such a district was recruited in large part by people who had recently been married elsewhere. In conclusion, he said he made no claim to finality in the Paper; it was written to indicate the possibilities of a new method, but if he were commencing the work again he would adopt quite different groupings of the districts.

The following candidates were elected Fellows of the Society:—

H. H. Bobart.
R. H Coats, B.A.
G. H. Cunningham.
W. H. Hamer, M.D., F.R.C.S.
P. Leask, M.A.
F. G. L. Spain.
J. C. Stamp.

MISCELLANEA.

An Attempt to Show from what Class the Out-Patients of a Voluntary Hospital are Drawn. By STEWART JOHNSON, *Secretary of the Hospital for Sick Children, Great Ormond Street.*

THE following statistics have been collected with a view to ascertaining from how large a section of the population the out-patients of a hospital have been drawn, and whether it is larger or not than that section of the population which competent authorities have declared to be in poverty. Of the two forms of abuse which hospitals are sometimes accused of tolerating—first, negligence in allowing patients to deceive them by making false statements of income; and secondly, ignorance of what constitutes poverty and the consequent admission of many who are not poor—it is obvious that the latter is by far the most mischievous. The number of impostors which even the laxest and blindest hospital could permit to pass must be small compared to the number which a hospital that has adopted an erroneous standard of poverty might allow to attend. It is important therefore for this reason that an effort should be made to ascertain from what class hospital out-patients are drawn, but it is perhaps of still more importance for economic and social reasons that knowledge should be obtained as to the inter-relationship of poverty and sickness. It is with these objects that this inquiry has been undertaken. The task is not an easy one. It cannot be accomplished by simply giving a list of the incomes of which the families of the various patients are in receipt.

Poverty is so largely individual. Of two families consisting of the same number of persons with the same income one may be poor and the other not. Necessities differ in each case, and one must know what a family's wants are in relation to their income before they can be judged poor or otherwise. In fact the judging of poverty is a matter for an expert.

For this reason few hospitals have a wage limit, since in practice almost as many wage limits as there are patients are required; and for this reason it is difficult, if not impossible, to show in terms of earnings to what class hospital patients belong. One can give the average wage earned by a large number of families, but it is impossible to strike an average between, say a clerk, a bricklayer, a baker's assistant and a railway porter.

Poverty then is relative and individual. There is, however, one point in this connection which can be seized upon with advantage. Though it is true down to a certain point that what is poverty to one is riches to another, yet a certain point must be reached at last when poverty must be poverty and nothing else, even to a family of the humblest and most exiguous wants. When the income of a family is so small that it is not sufficient to satisfy its smallest wants then the relativeness of its poverty becomes negligible, and it and others like it can be called absolutely poor. This is precisely in fact what Mr. Rowntree has done in estimating the amount and degree of poverty in York. Having first selected by means of an expert, individual by individual, out of the population of York all those who might be considered poor he next divided them into two classes:—

1. Families whose total earnings are insufficient to obtain the minimum necessaries for the maintenance of merely physical efficiency.

2. Families whose total earnings would be sufficient for the maintenance of merely physical efficiency, were it not that some portion of it is absorbed by other expenditure either useful or wasteful.

Poverty falling under the first head he described as "primary," under the last as "secondary" poverty. Minimum necessities he determined as follows: For food he allowed the smallest quantity of the cheapest kind that scientific opinion holds is necessary to support human existence in health and vigour; for clothing, the most economical adequate to keep the family in health without being so shabby as to injure the wage-earner's chance of gaining respectable employment; and for other household wants, only such as careful inquiry amongst working people, who had gained their knowledge by hard experience, showed could not be "done without." For rent he allowed the actual sums paid, "since rent is almost the first thing in which a poor family will try to economise." He allowed nothing whatever for travelling, or luxuries of any kind, or for sick and funeral clubs. His estimates suffice only for the bare necessities of merely physical efficiency in times of health.

Having first ascertained that the total of persons in poverty in York amounted to 27 per cent. of the whole population, he next by means of his new standard of measurement, divided this body of persons into the two classes of those in primary and those in secondary poverty, and found that the proportion that the first of these bore to the second was as 35 to 65. These figures were obtained by Mr. Rowntree for York only. Before Mr. Rowntree had begun this work, Mr. Charles Booth had almost finished his survey of life and labour in London. In this inquiry he found that 30 per cent. of the population were living in poverty, a result which agreed very closely with that of Mr. Rowntree in York. In fact Mr. Rowntree writes "From the commencement of my inquiry I have had opportunities of consulting with Mr. Booth and comparing the methods of investigation and standards of poverty adopted. As a result I feel no hesitation in regarding my estimate of the total poverty in York as comparable with Mr. Booth's estimate of the total poverty in London, and in this Mr. Booth agrees." Working in so much wider a field it was not possible for Mr. Charles Booth to divide his body of poor into two divisions by any such exact method as that employed by Mr. Rowntree. He did, however, divide it into two classes, the "poor," those "living under a struggle to obtain the necessaries of life," and the "very poor," "who live in a state of chronic want," and again into the "crowded," "those living two or more but less than three to a room," and the "very crowded," "those living three or more to a room." The proportion which the "very poor" bore to the "poor" was 27 to 73, and of the "very crowded" to the "crowded" 38 to 62, and the mean of these two processes 32 to 68 as against 35 to 65 at York. This would make the "very poor" of London rather less in proportion than the "primary poor" of York, but it must not be forgotten that the two are arrived at by different methods.

TABLE 1.—*Comparison of poverty in London and in York.*

	London (Booth).	York (Rowntree).	
	Per cent.	Per cent.	
Mean of poor and crowded	58	65	Secondary poverty.
,, very poor and very crowded	32	35	Primary poverty.

It seems not unsafe then to infer that the amount of poverty in York is comparable with that in London, and that in both places it can be divided into two bodies of approximately proportionate dimensions. It would be possible then for a general hospital to divide its patients into two bodies by the method used by Mr. Rowntree, and to show what proportion the one bore to the other. From this an idea could be gained from what class the patients of the hospital are drawn. In the case of a children's hospital, however, one must find the number of children in each class and the proportion between them. As large families are one of the chief causes of primary poverty, it would naturally be expected that there would be a greater proportion of children in primary than in secondary poverty. This is, in fact, the case at York. Out of the 7,230 persons in primary poverty, 4,215 were children, while only a very few more, 4,836, were children out of 13,072 persons in secondary poverty. Thus the proportion which children in primary poverty bear to children in secondary poverty is 47 to 53 instead of 35 to 65 for the whole classes, adults and children together.

TABLE 2.—*Comparison of children under* 15 *and of adults and children together in primary and secondary poverty respectively in York.*

	Adults and children.	Children only.
	Per cent.	Per cent.
Secondary poverty	65	53
Primary poverty	35	47

If then it was found at Great Ormond Street that of the children treated, those in primary poverty are to those in secondary poverty as 47 is to 53, it might be inferred that the patients are drawn from the 30 per cent. of the population that is in poverty; and that if the proportion is less or more, that more or less than this 30 per cent. are treated.

During a year about 30,000 patients are treated in the out-patient department of Great Ormond Street. These patients are drawn from all parts of greater London and beyond, rather more from the Northern districts than the Southern.

Of these 30,000 patients, about one-half are seen by members of the honorary visiting staff in the general department. The other half are seen by the casualty medical officers or by the honorary visiting staff in the special departments. As the general department is fed by the casualty department and feeds the special departments, the patients seen in the general department are a fair sample of the whole, and it is from their statements that the following tables are prepared.

The figures below give a comparison of the various departments from August 13 to December 31, 1910:—

	24*s.* a week and over.	Under 24*s.* a week.
	Per cent.	Per cent.
Patients seen by the hon. staff in general department	56	44
Patients seen by casualty medical officers and in special departments	55	45

Two sets have been prepared, one for the year 1908, and another for the twelvemonth April 1, 1909, to April 1, 1910. The former is based on the statements of 13,377 patients, the latter on those of 9,851. The explanation of the numbers being smaller in the second period than in the first is that the year April 1, 1909, to April 1, 1910, contained two Easters, and that in the latter year, in order to obtain more reliable figures, the statements of all patients interviewed by deputies of the inquiry officer when he was absent on his holiday, or through occasional illness, were omitted. In both periods, to avoid counting the same family twice over, the records of all second or subsequent visits after discharge of the same patient, or of all second or subsequent members of the same family have been eliminated from the tables. Then as the object of the inquiry officer's questions was not to provide material for the compilation of statistics, but to enable him to satisfy himself that the patient was suitable for hospital treatment, a result he could attain without eliciting all the facts necessary to classify a family with any certainty according to Mr. Rowntree's methods, a further deduction has been made. All patients sent with a doctor's letter or card are also omitted. These subtractions have reduced the odd 15,000 to 13,377 and 9,851 respectively, numbers which may be regarded either as individual children or as separate families about whom sufficiently full information was recorded to enable them to be classified after the manner of Rowntree. In the rest of the paper the figures for 1908 will be placed in brackets after those for 1909-10 for purposes of comparison and to avoid repetition.

A few words may be inserted here as to the method and scope of the inquiry into the means of these families. About each one the following facts were recorded: name, address, father's occupation, total family income, total number of family dependent, rent, number of rooms, whether the case had been before a private doctor or not.

In the case of irregular earnings, the inquiry officer tries to strike an average for the twelve months immediately preceding the date of questioning. In many cases no doubt the estimate thus formed is erroneous, but taken altogether the results are believed to be correct. For it is to be remembered that the greater the irregularity of the employment or the variation of the earnings the greater is the certainty of the family being very poor. The more difficulty there has been to determine the average income of family to a shilling, the more certitude there is that it could not be above primary poverty.

Every effort has been made to ensure accuracy. Indeed, the writer has to acknowledge his indebtedness to the inquiry officer of the hospital, Mr. W. T. Owen, for his care in taking down the statements of the patients, and to Mr. R. Addington, a life governor of the hospital, for carrying out the laborious work of making the 23,000 calculations necessary to determine the financial position of each of the patient's families. Moreover, the standard of measurement adopted, Rowntree's line of primary poverty, is in itself largely a guarantee of this accuracy. The line is drawn so low that there is no temptation to those on or about it to make out their income to be any lower than it really is, while even a large understatement by one far above it going undetected would be as likely to place the family just above as just below the line. There is an additional safety, too, in the slightly complicated nature of the standard. If a simple wage line such as 24*s.* or 25*s.* a week is taken, it is difficult for the recorder of the statements, where border line cases are concerned, to remain quite unbiassed. In a case of doubt he is inclined to give the benefit, according to temperament, for or against the hospital. But in the case of Rowntree's standard he cannot tell, as he takes the statement down, whether the family is going to be over or under the line. It is not until he has the income, rent, and family before him, and has deducted the second from the first, and compared the result with the amount allowed for a family of that particular size, an amount be it remembered which ends with an odd number of pence for each successive child, that the investigator can say whether a family is above or below the line.

Again, only errors sufficiently large to transfer a family that is above the line to below the line are of consequence. An inaccuracy that brings a family nearer, but not below the line, or which brings a family already below the line still lower, can be disregarded, since the argument rests on the proportion which those above the line bear to those below.

Statements as to income, however, even in returns for income-tax, on which very much more ambitious statistics than these are founded, are notoriously unreliable.

An attempt therefore has been made to detect and gauge any inaccuracy in the statements made by the parents. For this purpose 93 families, unsuspicious cases (suspicious cases were of course refused treatment at the hospital until they could bring a private doctor's card) selected at random, were visited in their homes, and the statements as far as possible verified. This investigation revealed several discrepancies; sometimes the families were found to be earning more and paying less rent than they had stated at the hospital, sometimes, oddly enough, though the fact is not unfamiliar to the most experienced almoners, the reverse was the case, the family actually earned less, and paid more rent, than they originally stated. The result of the inquiry, however, showed that out of the 93, three who had been placed below the line at the hospital, ought really to have been above it, say 4 per cent. None of these or any of the others, whose earnings were found to be greater than what they had stated at the hospital, were found to be sufficiently well off to be refused treatment at the hospital even had they made a more accurate statement in the first instance. Four could not be found at the addresses they gave, but according to their statements at the hospital they were already above the line. Five of those classed as "regular" ought to have been "irregular," and one "irregular" ought to have been "regular," that is to say, that on a more thorough inquiry one was in a better and five in a worse position than had at first appeared.

After these somewhat long but indispensable preliminaries the results of the classification of the patients at Great Ormond Street may now be given. Table 3 shows them:—

TABLE 3.—*Comparison of the children in poverty at York with patients at Great Ormond Street in the years* 1909-10 *and* 1908.

	Great Ormond Street, 1909-10.	Great Ormond Street, 1908.	York, 1899.
	Per cent.	Per cent.	Per cent.
Above the line of primary poverty (*secondary poverty*)	55	53	53
Below the line of primary poverty (*primary poverty*)	45	47	47

These figures, however, are subject to correction on account of under-statements of income.

Before this conclusion is formed, however, certain other considerations must be reviewed. Two of these relate to differences between London and York. First, travelling expenses. Mr. Rowntree made no allowance for these, since in a moderate sized town like York it is presumably possible for most workmen to go to and from their work on foot, whereas in London many workmen have to pay a daily fare on this account. In fact, travelling expenses in London are a corollary of rent. The lower rents in the outer districts can only be obtained at the cost of a journey every day. A shilling or two shillings a week would have to be deducted, in the same way as rent has been, from many of the family incomes, and would bring below the line many that are now just above.

Secondly, it must be noted that the cost of living is lower in

York than in London. According to the inquiry made by the Board of Trade, retail prices in York are as 96 to 100 to those in London, that is to say it takes 25*s.* to buy in London what can be bought for 24*s.* in York. If the difference in time is taken as well as the difference in place, the cost of living is still greater. Prices in 1899, the year of Mr. Rowntree's inquiry, are as 96 to 108 to those in 1908, 1909, 1910, the periods during which statistics have been collected at Great Ormond Street. That is to say, it would take 27*s.* to buy in 1909-10 what could be bought for 24*s.* in 1899. Had the minimum cost of living in York in 1899 as ascertained by Mr. Rowntree been corrected to suit conditions prevailing in London during 1908 and 1909-10, the line of primary poverty would have been raised, and there would have been more below it, and fewer above it. Next, it must be remarked that the "very poor," such as those in primary poverty, have an alternative gratuitous medical service in the Poor Law. In York, in the same year that Mr. Rowntree made his inquiry, 889 children received out-relief. About a third of these, 296, or 3 per cent. of the total number in poverty, primary and secondary, would probably receive medical relief. In Holborn Union, in which the hospital is situated, inquiry of Mr. Allan Battersby, the Clerk, who kindly allows the result to be published, shows that 123 orders for medical out-relief were granted to children during the last three months of 1910. Multiplying this number by four we get 492 patients, many of whom, but for the attentions of the parish doctor, would probably have been added to the odd 2,000 who annually come from the Holborn Union area. It will readily be seen that, if any children are kept away for these reasons, the numbers of those in primary poverty presenting themselves for treatment will be diminished, and their percentage decreased, while the percentage of those above the line will be increased. If to the numbers of patients in primary poverty were added the numbers kept away by the Poor Law, and the numbers of those wrongly included in secondary poverty, on account of the omission of travelling expenses, and of Rowntree's line not being adjusted to London conditions and the rise of price in recent years, there can be little doubt that the increase of the primary poverty class would be sufficiently great not only to absorb the supposed excess of 6 per cent. (or 4 per cent.) of persons out of poverty, but to compensate for still greater errors in the statements of patients that may not have been detected.

If this explanation is deemed satisfactory, it may nevertheless be urged that although the 45 per cent. (47 per cent.) below the line are undoubtedly in primary poverty, it does not necessarily follow that the 55 per cent. (53 per cent.) above the line are in secondary poverty. Some may be in secondary poverty, but others may be above, even far above, secondary poverty. In answer to this it must be pointed out, first that all these patients are chosen on the same principles as those in secondary poverty in York, on the same principles though by opposite methods, since in York they were *selected* out of the general population, whereas the hospital patients are the residue after those not in poverty have been *rejected*, Even if there has been any undue laxity in rejecting, it is manifest that there cannot be room among the 55 per cent. (53 per cent.) who are over the line for any who are above even secondary poverty, unless a corresponding number of those in secondary poverty stay away. If the secondary poverty class send their full quota of patients, and others come as well, then the percentage of those above the line would at once rise, and the percentage of those below would be correspondingly depressed. Likely though it is, as is sometimes thought, that those who are not poor should wish to attend the hospital, it is yet more unlikely that others who are unquestionably poorer should refrain from attending. Some interchange there undoubtedly is between those in secondary poverty and those above it, since seventy-seven cases of those over Rowntree's line were rejected on social grounds first, and subsequently passed for treatment on medical grounds, but changes other than these cannot in the nature of things be extensive.

The most reasonable interpretation of the figures that have been tabulated seems to be that the class from which the patients at Great Ormond Street are drawn is that 30 per cent. or 27 per cent. of the population termed by Mr. Booth and Mr. Rowntree the "poor," with two exceptions. At the very bottom of the scale some of the children in primary poverty who might become patients are kept away by reason of their receiving medical relief from the Poor Law; while at the other end of the scale at the extreme top, some children, whose parents could not be said in normal times to be in secondary poverty, are treated as patients owing to the exceptional nature of their illness, while room is made for them by the abstention of a corresponding number of children of parents in secondary poverty who enjoy better health. Moreover, the medical treatment of these classes is undertaken not solely by the hospitals, but is shared to an appreciable extent by private practitioners.[1] This is the interpretation which the writer, striving to be impartial, places upon the figures which have been collected and tabulated under his direction, but the figures may be capable of other interpretation.

Assuming, however, that the writer's interpretation of the figures is correct—that the out-patients of the hospital are drawn from a class equal to the poorest third of the population, one naturally asks, "Are these more or less than are entitled to such treatment?" It is probable that this question will be answered differently by different persons. Yet one would think it cannot be very far wrong for hospitals which are intended for the poor to treat those who have been defined as poor by the foremost authority on the subject. At any rate, it is open to those who disagree to state what proportion cases out of primary poverty ought to bear to cases in primary poverty, or what proportion of those in primary and of those in secondary poverty should be allowed to attend. If an agreement on this point could be reached, the controversy as to hospital abuse, which has lasted more than half a century because no one on either side defines what he means by poor, might be brought to a speedy termination.

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[1] 30 per cent. [31 per cent.] of the patients had previously been to private doctors. 19 per cent. [20 per cent.] of these were above Rowntree's line and 11 per cent. [11 per cent.] were below.

The children and families that have been under review have been divided into two classes, for the sake of comparison with the two classes into which Mr. Rowntree has divided the poor of York. But the picture thus obtained, valuable as it is for comparative purposes, suffers from being an instantaneous picture. The tables merely show one moment in the lives of the families concerned. The groups into which the population is statistically divided may indeed persist, but the units which compose them are continually changing places.

In fact, it is scarcely necessary to say, except that it is so easy to forget it oneself, that these groups as groups do not really exist, or rather the groups themselves exist, but not the dividing lines between them. That is to say the groups are not divided from one another like regiments of soldiers, but fade insensibly one into the other. Indeed, the aptest illustration that can be made is to compare them with various layers of a liquid each of varying temperature, the particles of which are for ever changing places with one another while simultaneously the layers themselves are perpetually rising and falling.

With this caution in mind, it is possible to analyse the patients' families in such a manner as to obtain a glimpse both into their past and into their future. The families have not simply been divided into two classes, one over, and one under, the line of primary poverty; they have been graded by intervals of 1*s.* above and below that line. If, therefore, we take five persons as the average sized family—father, mother and three children, and if we allow 3*s.* as the cost of a child per week (2*s.* 10*d.* is the allowance of Rowntree, but the extra 2*d.* can be taken to represent the increase of rent which cannot be avoided as the family grows larger), we can trace the financial position of the various families in relation to the datum level of Rowntree's line both backwards and forwards in time. The first group in this analysis consists of 3,052 (3,606) families, or 31 per cent. (27 per cent.) of the whole, who from the time they have three children, the average number—the least number to a marriage that can possibly ensure an increase of the population—are below the line. The next group is comprised of 1,393 (2,715) or 14 per cent. (20 per cent.), who only fell below the line when their children numbered more than three. The poverty of the first of these may be said to be due to smallness of wages, of the second to the largeness of their family. Next in order comes a group of 2,302 (2,670) families who are above the line at the moment, but who will presently be below. To arrive at this figure, all those families with two children who are not more than 3*s.* above, and all those with one child who are not more than 6*s.* above, have been taken. Of course some of these families will never have more children than the one or two that they have at present, but on the other hand several families with only one or two who are more than 6*s.* and 3*s.* respectively above the line at present will have more than three children, so that the numbers will be equalised. These families are 23 per cent. (20 per cent.) of the whole. Some of them will ultimately be classed with group 1 as having low wages, and some with group 2 as having large families. The next division is not so easy to make, but since we have been measuring in terms of children it will be convenient to take all those families who by the previous methods of reckoning have remained above the line, but who would be precipitated below it if they had one more child still. That is to say, 3*s.* a week better off than any of the families already enumerated. This accounts for 1,644 (2,446) families or 17 per cent. (18 per cent.). The remainder are 1,460 (1,940) or 15 per cent. (15 per cent.).

TABLE 4.—*Analysis of patients' families into five groups according to their past or future positions as to Rowntree's line of primary poverty.*

	Group I. In primary poverty from the time they have 3 children.	Group II. In primary poverty from the time they had more than 3 children.	Group III. Who will be in primary poverty as their families increase.	Group IV. All those not more than 3*s.* a week or 1 child better off than Group III.	Group V. All better off than Group IV.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1909–10	31	14	23	17	15
'08	27	20	20	18	15

Surveying these groups we see that for I and II providence is either out of the question or the choice of two evils. Insurance is not one of the expenses allowed for by Mr. Rowntree, and the cost of it can only be met by curtailing the diet. That is to say these people have to choose whether they will provide for future illness at the risk of bringing on illness, or try to keep themselves in health at the cost of making no provision for future illness. Class III could for the moment pay a small sum for insurance, but as they are destined ultimately to fall below the line, they will then be in the same dilemma as the members of Class I and II, and if they happen to have insured before, will run the risk of losing all that they have paid in policies, by lapsing. Class IV is only in a little better position than Class III. If their conventional necessities are greater, if they have appearances to keep up which are essential to their means of livelihood, if the wife is the slightly less skilful as housekeeper, they are no better off. It is only possible to maintain physical efficiency on the sums which Mr. Rowntree allows, if every penny is spent in the most judicious manner possible. When the law does not require a surgeon who has had a long and expensive education to use the highest possible degree of skill, but only a fair, reasonable and competent degree of skill, it is unreasonable to exact a higher standard in the ordering of their lives from a workman and his wife. On the other hand it is true that if these people planned their life some way in advance they might by postponing their marriage and by saving up while their children were few, accumulate a fund on which they could subsist until their children became self-supporting. It is probable, however, that persons of this degree of foresight and will power would be able to earn sufficient wages to render such a process either not strictly necessary, or of no great difficulty. Of the people who are lacking in these qualities one might say, "If they were not poor, they would not be poor." There remains the 15 per cent. who compose Class V. The members of it belong largely to the body of what is called "the black-coated working man," clerks, minor civil servants. Included amongst it are the seventy-seven cases before mentioned who were rejected on social, but passed on medical grounds. One hundred and sixty-eight had minor operations, ninety-three were prolonged cases. It is possible that, had the hospital possessed a skilled almoner for the whole period instead of for the last month only, some of them would have been rejected. If on the one hand these 15 per cent. or some of them may be regarded as debatable cases, as bordering on abuse, on the other hand they are the only patients who are able to take full advantage of the treatment given by the hospital. All the other 85 per cent. must at some time or other plunge through "primary poverty" or its fringes, an ordeal which may undo past years of care, or lay seeds of illness for life, against the consequences of which it would be unreasonable to expect even the best medical advice and skill to prevail. It would be difficult perhaps to find more striking evidence of the costliness and wastefulness of poverty.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*An introduction to the theory of statistics.* By G. Udny Yule. 376 pp., 8vo. London: Charles Griffin and Co., 1911. Price 10*s.* 6*d.* net.

The discussions of theoretical problems relating to the methods of statistical analysis which have been so actively pursued in recent years have produced a mass of material which, while useful to a comparatively narrow circle of specialists, is only indirectly available to the mass of those who desire to employ statistical arguments. The increasing tendency to rely on statistics in political and other discussions has made the work of systematising the somewhat scattered material one of growing urgency, and the demand has met with some response, so far as certain portions of the subject are concerned. In the work before us we have a more thorough and well-planned reduction to proper sequence of the different parts of the subject than has yet been produced in our own, or, so far as the writer is aware, in any language. The wood has become visible as well as the trees, thanks to the clear and careful exposition of Mr. Yule, who now offers to a wider audience than that which has had the benefit of hearing the Newmarch lectures in the eight years during which he delivered them, the matured product of the thought and effort devoted to that lectureship. One hardly knows whether to regret more that the author of this volume is no longer to be heard at University College, or to rejoice that the time no longer required by the lectures has been available for the preparation of the book.

It is no part of the aim of the work to deal with the collecting of statistical data, though here and there valuable hints to compilers of such data are thrown out, by showing how proper discussion may be facilitated through care to provide the material in a form which does not unduly hamper such discussion and analysis.

The first portion of the book is devoted to a branch of the subject, namely, the statistics of attributes, in the development of which Mr. Yule has himself taken a larger share than even in corresponding work connected with the later part. It is a branch of theory familiar to comparatively few, but the reader of this volume will not fail to recognise the propriety of leading up to the more familiar part of the theory by this discussion of attributes. Particular emphasis may perhaps be placed on the discussion of the consistency of data and of tests of association of the attributes to which they relate. It is probable that many readers, especially beginners, may find these chapters difficult, in part because they deal with less familiar ideas than those which immediately follow them.

The second part of the volume is devoted to the statistics of variables, and, basing the entire discussion on the conception of a frequency distribution, proceeds to treat of averages, measures of dispersion and skewness in such distributions, and correlation.

The third part discusses the theory of sampling, which is divided into two portions corresponding to the division of the earlier part of the book. This part of the theoretical discussion may perhaps be described as the least satisfactory, owing, however, to the nature of the subject and to the fact that the volume limits itself to such discussion as is possible without recourse to the more advanced portions of mathematics. The theory of sampling as expounded is limited in its application to sampling under conditions not usually found in statistical investigations, at any rate, in those dealing with social and economic statistics. In some degree the results of removing these restrictions are discussed, but there remains the impression of less reality about this part of the exposition than about the admirable treatment of other matters in the earlier chapters. Had the author been able to assume adequate mathematical knowledge on the part of his readers, he would doubtless have been able to offer a more satisfactory treatment of this difficult and important subject.

To each chapter there is appended a list of references to the original papers in which the subject of which it treats is discussed, and to books both in English and other languages. A series of examples to be worked by the student is also given, and these represent a large amount of labour and much skill in adaptation of material to the purpose. Students would do well to work some, if not all, of these examples, and, after following Mr. Yule through the volume in this fashion, to return to the beginning and read the book again. In this way they may expect to gain much more than by an attempt to grasp the whole at the first reading. This implies, what is the fact, that the book is by no means easy reading, especially for beginners. The fact is no reflection on its author, but results from the nature of the task which he has set himself. In parts beginners will find it necessary to expand some of the detail of the working out of illustrations, so that they will not be able to indulge in arm-chair reading. If they are impatient, and not in earnest, they may be inclined to turn from the book before the chapters on attributes have been passed. Though the difficulty of the mode of introduction selected must be acknowledged, its entire propriety can hardly be challenged, and those who persevere will reap the reward of the diligent. Mr. Yule has faced a task of no little difficulty, and has achieved conspicuous success in carrying it out.

It is hardly worth while mentioning the few trifles in the nature of defects which have been noticed in reading the book. It would appear that, as is inherently probable, rearrangement of material has occurred in the course of preparation of the book, and one or two references to examples have failed to secure corresponding alteration. Whether the reference to the foundation of the Royal Statistical Society as occurring in 1835 (p. 3) be a compositor's error, or a confusion between date of foundation and date of the first regulations, or arises from the fact that the celebration of the Jubilee of the Society was deferred till 1885, we do not know. However that may be, one thing is certain, namely, that the doubts which have sometimes been expressed, as referred to in the Jubilee volume, whether there be a science of statistics, or only a method of statistical analysis, are now definitely resolved, for the work of systematization accomplished by Mr. Yule has left the scientific nature of statistical theory plain to the most hardened doubter. A.W.F.

2.—*Wahrscheinlichkeitsrechnung und ihre Anwendung auf Fehlerausgleichung, Statistik, und Lebensversicherung.* Second edition (revised and enlarged). Von Emanuel Czuber, Professor an der technischen Hochschule in Vienna. Vol. i. *Wahrscheinlichkeitstheorie, Fehlerausgleichung, Kollektivmasslehre.* x + 410 pp., 8vo. Leipzig: B. G. Teubner, 1908. Vol. ii. *Mathematische Statistik, Mathematische Grundlagen der Lebensversicherung.* x + 470 pp., 8vo. Leipzig: B. G. Teubner, 1910.

Professor Czuber is to be congratulated upon the completion of an exhaustive treatise on the mathematical theory of Probability and of Statistics, embodying the substance of the greater part of his investigations on these subjects which have been published during the last twenty-seven years. In spite of his 900 pages, Professor Czuber's treatment is extremely compressed, and the great length of his book is due to the very wide range which he brings into direct relation with the fundamental theorems of mathematical probability. This new and greatly enlarged edition must long remain the standard treatise on the topics with which it deals. There is no work in English which covers at all the same ground, and it greatly excels in grasp and thoroughness the French treatises which most challenge comparison with it.

By expanding into two volumes the single volume of the first edition, which was published in 1903, Professor Czuber has been able to find room for considerable additions, and it may be convenient to readers of the earlier editions to indicate briefly the main alterations which have now been made. In the first part, which deals with the pure theory of probability, some 40 pages have been added which are mainly directed towards strengthening the philosophical side of the treatment. The second part, on the theory of error and the combination of observations, is virtually unchanged.

The third part, entitled "Kollektivmasslehre," and dealing with the subject of statistical frequencies, is entirely new. The fourth part is entitled "Mathematische Statistik," but of the three sections which comprise it only the first is concerned with general theory, the second section dealing with mortality statistics, and the third with invalidity. All through this part the additions are considerable. The philosophical treatment in the first section is enlarged, there is a fuller discussion than before of mortality tables, and the account of the statistics of invalidity and of their relation to those of mortality is mainly new. The fifth part, on the mathematical foundations of life insurance, is also enlarged, and there are, in particular, new sub-sections on invalidity insurance and on State insurance.

The foregoing summary shows that the work of most general interest is to be found in the three parts which comprise the first volume, and in the first section of the fourth part which covers the first 78 pages of the second volume. The rest of the second volume is mainly concerned with methods of technical detail with which students of insurance and mortality statistics need alone occupy themselves. For such students there is an advantage, no doubt, in bringing this detail into close connection with more fundamental theorems. But the selection of these particular applications to the exclusion of others for very full treatment in what is a general treatise is, from the point of view of the general student, rather arbitrary.

With regard to fundamental questions in the first part, Professor Czuber adopts what is probably the best course in a treatise which is mainly mathematical. He attempts no very searching analysis into philosophical difficulties, but assumes after brief discussions, which are often illuminating, the conclusions which reflective commonsense can reasonably expect that philosophers will ultimately justify. He does not solve any of the more perplexing problems in the philosophy of probability, but he almost invariably adopts the provisional conclusions which, at the present stage of the discussion, it seems on general grounds most reasonable to hold. Since the first edition was published he has moved, under recent German influences, somewhat further from what we may term the "disjunctive theory," and somewhat nearer to the "relativity theory." According to the "disjunctive theory," which was originally propounded, I think, by F. A. Lange, and which has found a good many supporters in Germany though not elsewhere, probability is based in a very fundamental sense upon disjunctive judgments or hypotheses. According to the "relativity theory," on the other hand, emphasis is laid rather upon the evidence, on which the probability is based and to which it must be referred. The "frequency theory," according to which probabilities have a very intimate relation in every case to statistical frequencies, and which, originally propounded by Leslie Ellis, has found many supporters in England though not elsewhere, Professor Czuber explicitly repudiates.

The theory of geometrical probabilities, which furnish the main examples of probabilities for which the number of alternatives is not finite, is dealt with fully. The method of mean values and a very representative collection of examples are reproduced from Professor Czuber's early memoir on this subject. The paradoxes and contradictions which not infrequently arise in these cases, M. Bertrand's example, for instance, in which several discrepant calculations can be found for the probability that a chord of a circle taken at random shall be greater than the side of the inscribed equilateral triangle, he attributes to ambiguity in the *data*, in the interpretation, in the above example, of the expression *a chord of a circle taken at random.* But he is not able to show precisely where the ambiguity lies, or why examples of this type lead to contradictory conclusions in some cases and not in others.

Laplace's Rule of Succession is dealt with carefully and is stated in a form which does not justify the more surprising of the conclusions which have been sometimes derived from it. But the treatment, at the beginning of the second volume, of inductive probabilities and of their derivation from *data* of statistical frequency, is not very satisfactory. It is not possible to deal with this far-reaching question in a review, but it seems to the present reviewer that Professor Czuber's method, which does not much differ from the treatment of the classical writers on probability, disguises the fact that these statistical inductions do not differ fundamentally from any other kind of induction, and permits him to attribute excessively high probabilities on evidence which would be admittedly insufficient in the case of other types of scientific induction. Consider the following example. In the period 1866-77 there were born in Austria 4,311,076 males and 4,052,193 females; in the period 1877-94 there were 6,533,961 male births; what, on this evidence, are the probable limits of the number of female births? It is contrary to commonsense to conclude on this evidence alone, as Professor Czuber does, that there is a probability of $\frac{45,249}{45,250}$ that the number of female births in the second period will lie between 6,118,361 and 6,164,813.

With regard to matters of more detail, there are a number of the ingenious examples in algebraical probability, for which the *Educational Times* used to be famous, and which are still sometimes set in examination papers. The solution of example xiii —which gives the probability that, if votes are drawn out one by one from a ballot box containing a votes in favour of A, and b votes in favour of B, a being greater than b, A will be ahead at every stage of the scrutiny—is specially satisfying in its simplicity. Of more importance is Professor Czuber's reproduction of Tchebycheff's very remarkable theorem, from which Bernoulli's theorem and Poisson's theorem can be derived as special cases. This result is reached rigorously and without approximation by means of the simplest algebra, and without the use of the differential calculus. Apart from the beauty and simplicity of the proof, the theorem is so valuable and so little known that it may be worth while to quote the result:—

"Given a set of quantities x, y, z . . ., each of which is capable of taking different values with different degrees of probability; and given that the average expectations of x, y, z, &c., are a, b, c, &c.,

respectively (*i.e.*, if $x_1 x_2 \ldots x_k$ are the possible values of x, and $p_1, p_2 \ldots p_k$ their probabilities, then $\sum_1^k x_r p_r = a$), and the average expectations of x^2, y^2, z^2, &c., a_1, b_1, c_1, &c., respectively; then the probability that the sum $x + y + z + \ldots$ lies between the limits $a + b + c + \ldots - \alpha\sqrt{a_1 + b_1 + c_1 + \ldots - a^2 - b^2 - c^2 - \ldots}$, and $a + b + c + \ldots + \alpha\sqrt{a_1 + b_1 + c_1 + \ldots - a^2 - b^2 - c^2 - \ldots}$ is greater than $1 - \frac{1}{\alpha^2}$, where α is any number greater than 1; it being assumed, of course, that the variations in $x, y, z \ldots$ are, in the strictest sense, independent of one another."

Professor Czuber makes no reference, however, to any other of Tchebycheff's interesting contributions to the theory of probability. Much of Tchebycheff's work, which was mostly published previous to 1870, appeared originally in Russian; and although his most important theorems were reproduced from time to time in the journals of Crelle and Liouville, it was not easily accessible until the publication at St. Petersburg of the collected edition of his works in French, which was completed in 1907. His theorems are, consequently, not nearly so well known as they deserve to be.

All through the book there have been added numerous references to the latest German literature on the subject, a feature of very great value to the English reader. With the development of the subject in France and England, Professor Czuber is less exhaustively acquainted. There are some brief references to Professor Pearson's methods for fitting frequency curves to statistical series, and to Professor Edgeworth's recent treatment of the law of error. But of the modern theory of correlation and of the central position which this now holds in English statistical theory, there is no hint. This is a very notable omission, for no one is better equipped than Professor Czuber for giving some account of the opinion of Continental thinkers on these modern developments. But the task of mastering the numerous papers and memoirs, scattered through a great variety of journals, in which the theory of correlation must at present be sought, may well prove too baffling for anyone who has not been brought up amongst them, and perhaps English statisticians ought to wait until they have presented their work in the compact and lucid form in which Professor Czuber presents his, before they can expect German thinkers to pass judgment on it. At any rate a comparison between the subject matter of Professor Czuber's or of any other of the recent German treatises on *Kollektivmasslehre* and that of Mr. Yule's recent introduction to the Theory of Statistics shows very remarkably on what different lines the best recent statisticians in the two countries have been advancing. Professor Czuber's methods are in direct line of descent from those of the classical writers on Probability and Error, and they possess the style and lucidity which such a history naturally gives them. But the reader must feel that these methods have reached their limit of accomplishment, and that nothing very novel can result from attempts to perfect them further. Recent English contributions, on the other hand, fragmentary and often obscure or inaccurate though they now are, seem to have within them the seeds of further development, and to carry the methods of mathematical statistics into new fields. At present the advantage is with Professor Czuber. With sanity of judgment in matters of philosophy and polished mathematical technique, he summarises for us and completes those modes of statistical enquiry which were evolved during the past century out of the ideas which Laplace and Gauss had originated. J.M.K.

3. — *Unemployment insurance: a study of schemes of assisted insurance.* A record of research in the Department of Sociology in the University of London. By I. G. Gibbon, with a Preface by Prof. L. T. Hobhouse. xvii + 354 pp., 8vo. London: P. S. King and Son, 1911. Price 6*s*. net.

The Martin White Professor of Sociology, who contributes a preface to this work, describes it as a searching and most painstaking analysis of experience gained abroad. He contrasts the success of the Ghent system of insurance with the difficulties and failures that have beset other experiments. He attributes that success to the absence of compulsion on the workman and of any burden on the employer, and suggests that it would be simpler to begin with the voluntary system which has proved its value abroad, and divide the burden between the State and the workman, leaving the employer out for the time. In these respects, his opinion differs from that of the Chancellor of the Exchequer, who stated in his speech of May 4th that "on the Continent, many efforts have been made [to alleviate the misery caused by unemployment; but that they have been] mostly failures, because they are all on the voluntary principle," and who has divided the contribution necessary for his scheme of unemployment insurance as follows: "that the workman shall pay 2½*d*. per week, and the employer 2½*d*., and that the State should take upon itself one-fourth of the cost." It is curious that the academic study of Professor Hobhouse and the political research of Mr. Lloyd George should have led to such directly opposite results.

In other respects, Mr. Gibbon has arrived at conclusions which are contrary to widely-accepted ideas. He considers that the State and local authorities should encourage and financially assist insurance against unemployment, which can be best effected through voluntary and self-managed associations, such as the trade unions; that side by side with insurance effected through such associations, the State should provide means of insurance for those not otherwise insured; and that insured persons should be given preference at labour exchanges, if as well qualified as other applicants, in the giving of public and (in so far as employers acquiesce) of private employment.

In the course of the discussion of this important question, Mr. Gibbon's views, based as they are on careful study and on a large induction of facts, will call for the fullest consideration; and the public are much indebted to him for having issued at the present juncture a volume which cannot but be of the greatest possible use in assisting them to arrive at a solution of the many difficult problems that surround the question. E.B.

1.—*Workingmen's insurance in Europe.* By Lee K. Frankel and Miles M. Dawson, with the co-operation of Louis I. Dublin. [Russell Sage Foundation.] xviii + 477 pp., 8vo. New York: Charities Publication Committee, 1910. Price $2.50.

In 1908 Mr. Frankel was commissioned by the Russell Sage Foundation to make a study of the question of insurance for working-men. Having devoted six months to the collection of the vast quantity of material contained in this volume, he returned from Europe and undertook other duties, and these prevented his proceeding with the investigation into the general social effects of the policies adopted in Europe, which he had contemplated making. The completion of the compilation of the information obtained, and its presentation in proper form, devolved upon Mr. Dawson and Mr. Dublin. The work does credit to all engaged in its production. As many as 145 well-arranged statistical tables are embodied in the text; four appendices containing further tabular information, and a bibliography add to its usefulness.

The work is divided into five parts, and under each division a statement is furnished of the progress of insurance in Great Britain, Norway, Sweden, Denmark, Holland, Belgium, France, Switzerland, Italy, Germany, and Austria, preceded by some general observations. With regard to insurance against industrial accidents, a lucid explanation is given of the change which has been effected by the substitution for the old system of employer's liability for negligence of the new principle of insurance by the industry of compensation to the workman, out of which has developed the extensive business of re-insurance of the employer. With regard to insurance against sickness and death, an excellent account is given of the working of friendly societies, and just appreciation is expressed of the success of the voluntary principle. In discussing insurance against invalidity and old age, the authors draw a distinction between annuities purchased by contributions solely or chiefly from those who are to receive the benefits, and pensions provided solely or chiefly from the contributions of others.

On the subject of insurance against unemployment, it is shrewdly remarked that there is a factor at work, the complete nature of which has not yet been revealed, that causes this kind of loss to come in cataclysms which coincide with times of widespread financial distress: but that this fact emphasises the importance of the question, and if, through the study of some systems of compensation for unemployment or insurance against it, the causes that lead to it could be laid bare, and means of prevention discovered, a most valuable economic service would be performed.

Finally, the tendency toward a complete and connected system of insurance for working-men is discussed. An interesting account is given of the Congress on Social Insurances held at Rome in 1908. "One session in particular was dramatic in its intensity. In some respects it resembled an old-fashioned religious revival meeting. Doughty campaigners like Luzzatti of Italy, and Mabilleau, Millerand, and Paulet of France, who at previous congresses had fought persistently for the principle of voluntary insurance as applied to sickness, old age, and invalidity, admitted their conversion to the doctrine of compulsion or obligation. But their change of heart ended here. Having acknowledged the weakness of every voluntary system, owing to the fact that the masses of population are not reached, each of the speakers demanded that in any compulsory system of insurance the greatest liberty should be permitted as to methods of administration." This quotation may serve to illustrate the shrewdness and clarity which the authors have brought to bear on the observation of the existing tendencies of European thought.

E.B.

5. — *Le Chômage : causes, conséquences, remèdes.* Par A. de Lavergne et L. Paul Henry. [Bibliothèque du Musée Social. Ouvrage couronné par l'Académie des Sciences Morales et Politiques, Prix Bordin, 1908.] 420 pp., 8vo. Paris: Rivière et Cie., 1910. Price 8 fr.

The Academy of Moral and Political Sciences, having selected as the subject for the Bordin Prize Essay in 1908 that of assurance against unemployment, awarded on November 28 of that year the prize to the present treatise. The authors analyse the causes of unemployment under two heads—those which arise from a diminution in the demand, and those which arise from an excess of the supply. The first they distinguish into causes independent of the human will, such as economic crises and social upheavings, and the periods of unemployment affecting particular trades; and causes in which human will reacts, such as unfavourable legislation, strikes, and lock-outs. The second they distinguish into general causes, such as the immigration of rural labourers into the towns, and causes affecting only certain classes of wage earners.

The authors draw attention to the imperfection of the statistics, and to the circumstance that the percentage of unemployment varies greatly in different trades, even when they are engaged in producing objects of necessary use or in full demand. They account for this largely by the varying amount of industrial training and efficiency required by the several occupations. Where this is higher, the proportion of unemployment will in general be lower. Other causes might no doubt be suggested for the phenomenon, which is everywhere met with, and is one of the great practical difficulties in the way of unemployment insurance.

They arrange the suggested remedies under the following heads: —Preventive measures, curative measures, provident saving, insurance, public assistance, subventions. They discuss from these various points of view a vast number of proposals made in different quarters, including projects based on individual saving, either voluntary or obligatory; projects based on insurance; on the establishment of a national fund; on assistance to voluntary funds; and on co-ordination and co-operation with other great social institutions. They arrive at the conclusion that much may be done towards the diminution of unemployment by better industrial training, better commercial organisation, and the encouragement of thrift; and that, although these measures cannot completely remedy the evil, they will not be attended with the difficulties and dangers that are to be apprehended from more ambitious projects of social assurance. E.B.

6.—*Études statistiques, économiques, sociales, financières et agricoles. Les Habitants. Démographie, salaires, corporations et syndicats, assistance, mutualité, épargne, prévoyance, impôts.* Par Edmond Michel. viii + 480 pp., 8vo. Paris et Nancy : Berger-Levrault et Cie., 1910. Price 13 frs.

Monographs on small communities within a large State are becoming common. They are extremely valuable in the wealth of first-hand knowledge which they contain, and, within proper limits, in the light they throw on the life and activities of the whole State. The present volume, in which M. Michel describes the canton and town of Bayeux, in Normandy, its communal life, organisation, and activity, partakes of this character. Bayeux is taken as a typical French canton possessing an intense and personal local life. The writer, however, does not confine himself to the canton, but frequently discusses questions and examines facts from the national point of view. The canton appears to be often used as a particular illustration of general or national conditions. The volume is the second of three statistical studies. The first, not yet published, deals with the topography, geology, manners and customs, and social classes of a "canton-type," presumably Bayeux; the third, dealing with property and wealth, was reviewed in the *Journal* in March, 1909 (vol. lxxii, p. 137). In the volume under notice the following groups of subjects are dealt with: (i) the demography of Bayeux and incidentally of France; (ii) wages, cost of living, unions and corporations in Bayeux; (iii) public assistance, mutual help, and savings banks; and (iv) taxation. It is impossible in a brief review to follow M. Michel in detail, and we therefore content ourselves with noticing one or two of the general questions which are discussed.

Like other French writers who deal with the demographical facts of France, M. Michel laments the low birth-rate and almost stationary population which characterise his country. He is satisfied that the causes are, in general, moral and economic rather than physiological. The transformation of industry and commerce in recent times has divorced labour from the soil and concentrated it in huge towns. Independence, of a sort, and class solidarity have replaced the old practical serfdom on the land. On the part of women there is an increasing aversion to the "servitude of maternity," and a desire for "woman's rights," or, as the author puts it, a growth of "feminism." The result of these and other causes which he mentions is a decreased birth-rate. The vanishing excess of births over deaths in France is doubtless serious, yet the restriction of births, so far as the causes thereof are to be found in aspirations towards a more comfortable and independent life on the part of women and the working classes generally, cannot be unreservedly condemned.

M. Michel refers to a "League for depopulation" which has invaded Bayeux and exhorted the people to have few children, and quotes this placard :—

"Dieu (?) bénit
les nombreuses familles,
mais ne les nourrit pas.
Ayons peu d'enfants."

M. Michel's anxiety for births is so great that, although on p. 3 he refers to the "alarming" growth of irregular alliances, on pp. 128, 129 he appears to condone illegitimacy, and even to declare an unmarried mother preferable to a sterile wife.

Calvados, the department in which Bayeux is situated, ranks unenviably high in the scale of illegitimate birth-rates. This is partly attributed to alcoholism, which is also made jointly responsible with other causes for the low birth-rate in this region. The particular table of figures on p. 127, used to illustrate the relationship of alcoholism and illegitimacy, does not, however, confirm the theory. The correlation between consumption of alcohol and the ratio of illegitimates per 1,000 births is insignificant and negative—that is, so far as it goes, it means that illegitimacy tends to decrease, and not to increase, as consumption of alcohol increases. There is, in fact, high alcoholism in this particular region and high illegitimacy, but this may be a coincidence.

M. Michel is a strong individualist. He believes in association or union of labour in order to maximise its power, but also to secure to each worker the greatest possible share of "individual rights," and to prevent him becoming a victim of State collectivism. He will, therefore, have nothing to do with socialism. He appears, however, to give too much weight to the disruptive tendencies of socialism in its more violent forms, as well as of "feminism" as indicated earlier, and too little, if any, to their more or less evolutionary character, and the part they seem destined to play in modifying the existing organisation of society.

Although we have dealt with some of the general questions discussed in this book, rather than with the descriptive material of which it is full, the reader must not forget the latter, or think it is overweighted by the former. Every section contains much that is interesting and valuable, and the whole work bears evidence of painstaking research. The student of economic history will find considerable information concerning the old trade corporations or guilds existing in Bayeux before the Revolution of 1789, and something of wages and prices in those times. The social worker will learn much respecting existing corporations and associations, present wages and cost of living, illustrated by working-class budgets, and the institutions for public assistance and mutual help. Finally, the student of finance will find in the last section a synoptical account of the taxes imposed before the Revolution, as well as a description of existing financial arrangements. While depicting things as he found them, M. Michel never hesitates to point out where and how they might be improved.

There are a few minor faults in the book which might be remedied in any later edition. On pp. 4, 54, and 58 the term "démographie statistique et dynamique" is used. "Statistique" should doubtless read "statique." Many of the diagrams and tables are apparently reproductions of the original manuscript, and are not very clear. It would have been much better to have had them printed in the ordinary way. A.D.W.

7.—*Banques d'Emission et Trésors Publics.* Par Raphael-Georges Lévy. xxiv + 628 pp., 8vo. Paris: Hachette et Cie., 1911.

M. R. G. Lévy has been well-known as a writer on financial and banking questions for the last quarter of a century, but the present work is likely to reach a wider circle of readers than any of his former contributions to these subjects. It aims at giving a complete account of the various existing systems of note-issue, of their relations with the State (or more precisely, with the public Treasuries), and of the direct and indirect consequences of these relations.

We already have works, of course, dealing with these questions, and notably the admirable treatises of M. Octave Noël and Mr. Charles Conant, to say nothing of the various histories of the great national banks. But neither of the two writers mentioned covers quite the same ground, or in quite the same way, as our author. Mr. Conant's "Banks of Issue" is largely occupied with a study of the general banking systems of the countries considered, and not the least valuable part of it deals with the history of commercial crises. M. Lévy confines himself rigorously to the subjects covered by his title. His book has more in common with M. Noël's "Les Banques d'Emission en Europe." But M. Noël expressly limits his survey to European banks; and as, unfortunately, his second volume has not yet been published, the only banks actually treated by him are those of England, France, Germany, Austria and Belgium. Moreover, he goes into very full detail in regard to matters of history and administration, and gives a more elaborate discussion of questions of policy than would be possible or desirable in a work conceived on the lines of M. Lévy's book. Thus M. Noël gives 135 pages to the Bank of France, M. Lévy 50 pages; the Bank of Austria has 131 pages in M. Noël's work, 21 pages in M. Lévy's. M. Lévy aims at a completeness which obliges him to be concise. He even includes in his survey the Banks of Morocco, Formosa, Corea, Hayti and Ecuador; indeed it does not seem that any country with a banking system is unnoticed. The book, in short, is a kind of reasoned dictionary of reference on its subject. The exposition is so clear, and the selection of matter so wisely made, that readers will easily and rapidly seize the essential facts of the situation in regard to whatever country they may happen to be concerned with.

It would, however, be entirely unfair to represent this book as *merely* a dictionary of reference. It is really an elaborate study of the relation of the State to the banking system, in which the various descriptions really serve as illustrations of the main argument. It is the nature of this relation in each case which determines the arrangement of the book. Countries are grouped, not geographically, but according to the character of their issue regulations. What specially interests M. Lévy is the trend of modern banking evolution, whether as to instruments or institutions; and he concerns himself with history only in so far as history is essential to the understanding of present conditions and present tendencies. A special feature of his exposition is the stress he lays on balance sheets. They are the key of the banking problem, he says. But as he aptly adds, "comme les manuscrits des siècles passés, ils veulent être déchiffrés avec soin;

nous comparerions même volontiers quelques-uns d'entre eux à des palimpsestes, dont la surface doit être enlevée, afin de laisser apparaître ce qu'elle recouvre, et qui est infiniement plus précieux et instructif que l'écriture qui surchargeait l'ancien texte," &c. A prime consideration which should guide our judgment on these documents is that of convertibility. How far are the assets liquid? This, he says, is the very touchstone of a banking system. Here, as indeed throughout the work, his conclusions will commend themselves to English students of banking. They are everywhere sound and clear, and evidently the result of a wide familiarity with financial history and banking practice. It would be impossible to check all the statements of fact in a work of such wide range. The present writer has noticed no inaccuracies, and it is obvious that M. Lévy has based himself on official documents and the best authorities.

If M. Lévy's work is inspired by a practical purpose, and few books of value are not, he has not tried to conceal it. As he truly says, the conclusion that emerges from his study is written in every line of the chapters that compose it. He sums it up in the phrase of Grover Cleveland. There must be a divorce between the public treasury and the banking system. It is not the function of the State, he says, to give or to manufacture credit. The State may regulate banking, may even share its profits, but nothing more. State banking, he says, is a formula dear to socialists; but unfortunately for them, at every point the study of the past and observation of the present give the lie to their theory. He wishes this to be the last word of his volume.

It is worthy of note that M. Noël and M. Lévy vie with each other in the strength of their protest against the nationalisation of banking, or any measure tending to make banking an instrument of the professional politician. They quote M. Thiers in 1872: "La Banque nous a sauvés, parce qu'elle n'était pas une Banque d'État." Mr. Conant agrees. He says, "M. Thiers summed up one of the lessons of sound banking in this sentence." Englishmen will recall Burke's utterance: "Our paper has value on 'Change because in Westminster Hall it has none." If they are ever inclined to reverse the policy thus accredited, they will have to search among the third-rate States for their exemplars. H S.F.

8.—*Histoire du Commerce de la France. Première Partie: Avant* 1789. Par E. Levasseur. xxxiii + 611 pp., 8vo. Paris: Arthur Rousseau, 1911. Price 12 fr. 50 c.

The veteran French statistician and economist, to whose large erudition and unwearying industry the fresh contribution to Economic History before us now is due, is, if he will allow us to say so, a subject for the envious admiration of younger students and authors. As he himself observes in his Preface, with the completion of his monumental history of the working classes and of industry in France by the publication a few years since of the concluding volume dealing with the Third Republic, he had thought that he had written his last work. But, happily for his many readers, both in his own and in other countries, this was not the case; and in his new book we have the first instalment of a fresh enterprise which will form a fitting complement to the previous larger history. It is characteristically planned on a scale only less considerable than the earlier treatise because the reduced size is suited to the altered needs of the occasion. M. Levasseur shows that there was a gap in French economic literature waiting to be filled by such a study, tracing the development of French commerce, domestic and foreign, from its earliest beginnings to the present day; and he remarks that he has treated different portions of the subject in his lectures at the Collège de France during the last forty years. Of his ample qualifications for the successful achievement of the task he has set himself no French or English student, who is acquainted with his deserved repute and his accomplished work, can entertain a doubt. They will find in this first instalment of his new book, which deals with the period anterior to 1789, the same admirable merits which have won their fame for his earlier contributions to economic and statistical literature. The complete command and the facile use of vast stores of accurate learning, the sure instinct for appropriate selection of the necessary and the apposite from the mass of the irrelevant, the unfailing aptitude for clear arrangement and lucid exposition, and the judicial fairness, with which controversial questions are successively approached and handled, appear in this as in former productions of the same active and attractive pen. Our author knows how to make his narrative interesting without failing to be adequate. He has learnt by ripe experience the means, which many alas do not succeed in finding, to lighten opportunely the burden for his readers of the wide and accurate erudition which he himself carries with such convincing mastery. We can discern no signs in this production of the frequent accompaniments of those advancing years to which M. Levasseur himself pathetically alludes; and we confidently hope that the youthful courage, which has combined with the mature accumulation of knowledge gathered through a long and honoured career of untiring industry to give to the economic and statistical world this first instalment, will enable the respected and distinguished author, in his own words, to finish what he has undertaken, and to leave to economic studies this crowning proof of the aims and efforts to which his whole past life has been so felicitously devoted.

As we have said, and as we should expect, the work is comprehensively planned. It is not merely the foreign trade of France which is described; but her internal commerce, which indeed, as M. Levasseur remarks, can, for a large part of the period included in the present book, be separated with difficulty from her external business, is also investigated. The earliest official figures of foreign trade date only, he observes, from the reign of Louis XV. Nor is the history of commercial development traced without bestowing due notice on the environment in which French commerce has arisen and grown from small beginnings to ripe maturity. As M. Levasseur states, the test conditions of business can only thus be properly understood. The means of communication, for example, are examined; and throughout French economic history it is remarkable how large and important a part has been played at every epoch by the excellence and the abundance of French waterways. As money is the tool of exchange, monetary history has also to be considered, and the variations in the output of the precious metals, and the changes in their use for coinage, meet with due attention. Markets and fairs, the seats of commerce, colonial adventure and the formation of trading companies, the customs tariff, protection and free trade, commercial treaties, and, generally, foreign relations, so far as they affect the main subject of the book, find a place in the narrative. Nor does M. Levasseur fail to take due account of the pertinent consideration, which some economic historians do not keep with sufficient definiteness and constancy before their minds, that politics and economics are connected with one another, and cannot be treated adequately, if an attempt be made to preserve a rigorous distinction between events and forces belonging the more obviously to either sphere of human action.

The period of which he treats in this commencing volume is divided into nine main sections, with subdivisions of different character. As we leave remoter times, and draw near to modern days, the material naturally becomes more abundant, and the length of years treated in each section is, in consequence, reduced. But, despite of the meagre evidence of business activity in such a distant epoch as that pre-Roman Gaul which forms the subject of the first section, and, despite also of the hindrances to trade presented, after the Roman Gaul of the second chapter, by the barbarian incursions of the third or Frank period, from the earliest beginnings the favourable geographical situation of the country, lying as it does between the Mediterranean Sea and the Atlantic Ocean, its fertile soil and its genial climate, and the number and convenience of its rivers, have amply justified the laudatory title of "la belle France" bestowed by the home-staying affection of its inhabitants. Under the "pax Romana," moreover, appreciable economic development took place. The fourth and fifth portions of M. Levasseur's story are coincident with feudalism, when in France, as in other countries, the self-sufficing village, with its lord and his more or less servile dependants, was the prominent feature of an economic life which was mainly agricultural. But the towns were nevertheless acquiring privileges of their own by meeting the needs of their superiors for ready cash, those who dwelt on royal or ecclesiastical domains being apparently the more favoured in several respects, and, as the power of the monarchy grew, that of the great feoffees declined, the country itself became more unified and commerce steadily developed. The personal qualities of St. Louis, for instance, tended to promote economic advance, just as the Hundred Years War was, by contrast, one of the most distressing periods of French history. With the sixth division of M. Levasseur's account we pass to the modern world as it may properly be called. For this period comprises the sixteenth century and is known as the Renaissance. Now commerce in all its forms takes a new start and economic history becomes fuller of important movement. In the seventh period Henry IV and Richelieu appear upon the scene, in the eighth the still greater and more conspicuous names, economically regarded, of Louis XIV and Colbert are introduced, and the final ninth period embraces that eighteenth century which, beginning with the daring ill-starred monetary ambitions of John Law, ended with the new liberalising creed of the Physiocrats. In this fashion, of which we have given but a brief and an imperfect idea, M. Levasseur conducts his readers through the succession of the ages; and, as we have observed before, his guidance is as masterly and compelling as his narrative is interesting and readable. In conclusion we would unreservedly recommend the addition of this the latest, but, we hope, not the last, product of his pen to every economic library in this country, where the fame he enjoys, and the respect he commands, are no less considerable than in that favoured land of whose industry and commerce he has already furnished or is now supplying the authoritative accounts. L.L.P.

9.—*Problems of local government.* By G. Montagu Harris, M.A., Barrister-at-Law, Secretary to the County Councils Association of England and Wales. xii + 464 pp., 8vo. London: P. S. King and Son, 1911. Price 10*s.* 6*d.* net.

In 1910 there was held at Brussels, during the International Exhibition, the first Congress on the Administrative Sciences. Mr. Harris acted as Secretary to the British Committee, and the purpose of this volume is to give an outline account of the proceedings of the Congress and the problems therein discussed, and to bring together in a convenient form the papers contributed from England and Scotland. With the exception of a useful sketch by Sir Thomas Elliott of the organization and work of the Board of Agriculture and Fisheries, all these papers relate to *local* administration; this limitation, though contrary to the original intention of the Congress, seems to have been a marked feature of its proceedings, for we are told that "although papers on the central administration were invited" from all participating countries, "few were sent in."

Putting aside Sir T. Elliott's paper, and two short accounts of the Dutch Bureau of Agriculture and the United States Department of Agriculture which are included for no very obvious reason, since they are too slight to be of any appreciable value, the second part of this volume contains 20 papers, covering about 250 pages. They deal with the general structure of English and Scotch local government; special branches thereof, such as education, poor relief, sanitation and highways; the co-operation of public and private agencies; local taxation, finance and auditing; the forms of central control; the restraints upon administrative action; and the status of officials. From this brief summary it will be apparent that none of the papers are very detailed; beyond occasionally suggestive criticisms they contain little that will be new to British readers; but all are by recognised experts, and their main value lies in the fact that they offered to the foreign members of the Congress a convenient and impartial summary of English and Scotch systems and methods. In this connection we share Mr. Harris's regret that the school of English poor law reformers which does not follow the lead of Mr. Sydney Webb was not represented at the Congress.

The chief interest of the book for British students lies in the courageous attempt made by Mr. Harris in the first 160 pages to describe the various problems raised in the papers furnished from the other participating countries, so far as they related to local government, and to indicate the general trend of the discussion thereon, always bearing in mind comparisons or contrasts with the conditions prevalent in the United Kingdom. The difficulties in the way of complete success for such an undertaking were considerable. "Germany stood almost aloof from the Congress"—hence there were no contributions relating to Prussian local government, and there were no papers on city administration in the United States; and these omissions result in serious defects in a comparative survey intended to be of value to British readers. These defects are particularly noticeable in the discussion of such matters as the classification of areas (p. 10), alterations of boundaries (p. 27), sanitary administration (p. 45), education (p. 53: "to this subject little attention was paid in the Congress"), and the municipalisation of services. The abundance of papers on Belgian, French, Swiss and Italian conditions scarcely afford adequate compensation. Further, Mr. Harris observes (p. 32) that "the foreign papers . . . are singularly lacking in any general account of the powers and duties of local authorities in any country"; and his earlier remark (p. 29) that "any general survey must therefore be based, in many cases, on fleeting allusions rather than on detailed statements" suggests that he himself does not feel altogether sure of his ground. In spite of these difficulties Mr. Harris may be congratulated on an interesting essay, which presents to the student of comparative politics a number of points deserving of further investigation.

In conclusion, two statistical points may be noticed. The results obtained up to 1902 in two towns (one quite small) scarcely afford a sufficient basis for the contention, which appears to have been put forward in one paper, that municipalisation in France has been a success—even if the figures given (p. 75) were intelligible, which they are not. The careful census of officials, or rather of all State employees in a number of countries, for which M. Fernand Faure pleads (pp. 111-113) should yield very interesting results; even the imperfect figures here given are instructive, as showing the proportions of the respective populations which are in the service of the central or local authorities. The subject, on both its social and political sides, deserves examination. P.A.

10.—*Other New Publications.**

Baab (*August*). Zur Frage der Arbeitslosenversicherung, der Arbeitsvermittelung und der Arbeitsbeschaffung. vii + 389 pp., 8vo. Leipzig: A. Diechert, 1911. Price 7*s.* 6*d.*

[Deals with the question of unemployment insurance in Germany and with the different schemes that have been tried in several of the German towns for dealing with the subject. There is a statistical appendix.]

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* See also "Additions to the Library," page 674, *sqq.*

Bois (*Joseph*). Le Socialisme et la Conquête des Paysans. A travers les campagnes Bourbonnaises. 116 pp., sm. 8vo. Paris: Marcel Rivière and Co., 1911. Price 1 fr. 50 c.

[An account of the efforts, mostly fruitless, of the Socialists to extend their influence amongst the French rural population.]

Fisher (*Irving*). The purchasing power of money, its determination and relation to credit, interest and crises. xxii + 505 pp., 8vo. New York: Macmillan and Co., 1911. Price 12*s.* 6*d.* net.

[A study of the principles determining the purchasing power of money and of their application to the study of changes in that purchasing power. The author maintains that if these principles be correct the purchasing power of money depends on certain definite factors. The main contentions of the book are based on the quantity theory of money, which the author considers is still fundamentally sound.]

Graham (*William*). The One Pound Note in the history of banking in Great Britain. (Second edition.) xv + 410 pp., 8vo. Edinburgh: James Thin, 1911. Price 9*s.* net.

[The first edition of this book was issued in 1886, and in the present edition several chapters have been partially re-written and the historical portion brought up to date. The author is of opinion that the objections to this form of currency in England are no longer valid, and that the introduction of the one pound note into England would strengthen its banking system. Among the illustrations is Cruickshank's grim bank restriction note.]

Heron (*David*). Mental Defect, Mal-Nutrition, and the Teacher's Appreciation of Intelligence. A reply to criticisms of the memoir on "The Influence of Defective Physique and Unfavourable Home Environment on the Intelligence of School Children." 34 pp., 8vo. London: Dulau and Co. Price 1*s.* net.

Hirst (*F. W.*). The Stock Exchange. A short study of investment and speculation. 256 pp., 8vo. London: Williams and Norgate, 1911. Price 1*s.* net.

[A short account for the general reader of the Stock Exchange and of its working at home and abroad. The book contains useful information as to the judicious investment of savings and the avoidance of speculative securities.]

Hopkins (*Captain L. E.*). (Editor.) The Universal Railway Manual. Containing valuations of the principal British, American and Foreign Railway Stocks. viii + 591 pp., charts, &c., 8vo. London: The Society of Railway Stockholders, 1911. Price 7*s.* 6*d.* net.

[A useful compilation of the statistics of railways at home and abroad for the last ten years and of general information in relation to them. The author is in favour of railways as investments, and shows that in stability they compare favourably with other fields of investment.]

Jackson (*Edward*). A Study in Democracy: being an account of the rise and progress of industrial co-operation in Bristol. xvi + 606 pp., 8vo. Manchester: Co-operative Wholesale Society's Printing Works, 1911. Price 2*s.* 6*d.*

[The aim of this book is to give an account of the co-operative movement in Bristol. The first part of the book deals with mediæval ideals and practice, and with the work of the Bristol pioneers; the remainder is devoted to the more modern phases of the movement.]

James (*J. A. Barbour*). The Agricultural and other Industrial Possibilities of the Gold Coast. With which are included Extracts of the Reports of the Agricultural Exhibitions held at Accra, Cape Coast Castle, Sekondi, and Coomassie. 109 pp., 8vo. London: St. Bride's Press, Ltd., 1911. Price 2*s.* 6*d.*

[Observations, based mostly on personal experience, on the methods necessary for the development of agricultural and other industries on the West Coast of Africa.]

Knibbs (*G. H.*). Studies in Statistical Representation. On the nature of the curve $y = Ax^m e^{nx^p}$. (Commonwealth Bureau of Census and Statistics.) 8vo. Melbourne, 1910.

Lawson (*W. R.*). Canada and the Empire. viii + 420 pp., 8vo. Edinburgh: Blackwood and Sons, 1911.

[The author is of opinion—in view of recent events, foremost among which is the pending commercial agreement between the United States and Canada—that the time has come for the immediate and effective federation of the British Empire. The book is divided into sections entitled political, financial, economic, banking, commercial, and Imperial, each of which is subdivided into several chapters, thus doing away to a certain extent with the necessity for an index, which the book lacks.]

Le Rossignol (*James Edward*) and *Stewart* (*William Downie*). State socialism in New Zealand. ix + 311 pp., 8vo. London: G. G. Harrap and Co., 1911. Price 5*s.* net.

[This book is the result of a series of studies of the experiences of New Zealand in State socialism. Among the subjects discussed are land tenure, State life and fire insurance, old age pensions, compulsory arbitration and wages and cost of living.]

Levy (*Hermann*). Large and small holdings. A study of English agricultural economics. Translated by Ruth Kenyon, with considerable additions by the author. viii + 249 pp., 8vo. Cambridge: The Cambridge University Press, 1911. Price 10*s.* 6*d.* net.

Lewinski-Corwin (*Edward H.*). Workmen's insurance in Belgium. 122 pp., 8vo. New York: Columbia University, 1911.

[Belgium is industrially one of the most highly developed countries of Europe. Optional insurance of workmen of one kind and another has been in existence for the last fifty years, and the present volume is a study of the newly formed scheme of general accident insurance, and also of the methods of sickness and old age and invalidity insurance already in existence. There is also a chapter dealing with unemployment insurance, principally with the Ghent system.]

Murray (*J. Alan*), B.Sc. The Economy of Food. A popular treatise on Nutrition, Food and Diet. xii + 253 pp., 8vo. London: Constable and Co., Ltd., 1911. Price 3*s.* 6*d.* net.

[This book is intended primarily for students of domestic economy, managers of institutions, &c., rather than for specialists in physiology or hygiene. The interest is largely centered upon the pecuniary aspects of the subject, and the prices quoted may fairly be taken as the average prices prevailing in different parts of the country.]

Neymarck (*Alfred*). Finances Contemporaines. Vols. vi and vii. L'Epargne Française et les Valeurs Mobilières 1872-1910. 2 vols., xiv + 437 and 569 pp., 8vo. Paris: Felix Alcan, 1911. Price 15 frs.

[In these two volumes the author has brought together a number of studies covering a period of years dealing with thrift in France and its investments in French and other securities. The essays are reproduced as originally written, the author having refrained from altering opinions expressed at the time of writing, which in view of later developments may be subject in certain cases to considerable revision.]

Prato (*G.*). Le Dogane interne nel secolo XX. Il mercantilismo municipale. (Supplement to "La Riforma Sociale," Mar.-April, 1911.) 58 pp., 8vo. Rome, 1911.

Seligman (*E. R. A.*). Théorie de la répercussion et de l'incidence de l'impôt. Traduction française d'après la troisième édition américaine par Louis Suret. 551 + 16 pp., 8vo. Paris: Giard and Brière, 1910. Price 15 frs.

[A French translation of the third edition of Prof. Seligman's well-known book on Taxation. The author remarks that, during the eleven years that have elapsed since the last edition, financial problems have arisen in different countries which have caused renewed interest in the question of the shifting and incidence of taxation. The writings that have appeared as a result of this renewed interest have been examined and utilized by the author, who does not find that there has been any substantial change in the theories themselves.]

Stewart (*C. Hunter*, M.B., D.Sc.). The Sex and Age Incidence of Mortality from Pulmonary Tuberculosis in Scotland and in its Groups of Registration Districts since 1861. (Reprint from Proceedings of Royal Society of Edinburgh. Session 1910-11. Vol. 31. Part 3. No. 22.) 8vo. Edinburgh, 1911. Price 6*s.*

Thomson (*William*). Dictionary of Banking. A concise Encyclopædia of Banking Law and Practice. vii + 554 pp., la. 8vo. London: Sir Isaac Pitman and Sons, 1911. Price 21*s.* net.

Wateridge (*F. W.*). Prosperous agriculture and home life. What it means to the nation. 263 pp., 8vo. London: Swan Sonnenschein and Co., 1911. Price 2*s.* net.

[Deals with the importance of agriculture and the increase of home-grown food. The author advocates the removal of taxes on food-producing land and the provision of cheap money by the State for the upkeep of agriculture. It is shown that the result would be an enormous increase in the value of agricultural production.]

Webb (*A. D.*), B.Sc. The New Dictionary of Statistics. A complement to the fourth edition of Mulhall's "Dictionary of Statistics." 682 pp., 8vo. London: G. Routledge and Sons, 1911. Price 21*s.* net.

Wickens (*Chas. H.*). Professional Paper on Census Taking. (Commonwealth Bureau of Census and Statistics.) 16 pp., 8vo. Melbourne, 1911.

Wynne (*R. V.*). An ideal tariff and the constitution. xii + 113 pp., 8vo. London: P. S. King and Son, 1911. Price 1*s.* net.

Denmark. L'Agriculture en Danemark depuis le milieu du 19^e^ Siècle. 170 pp., 4to. Copenhagen, 1911.

France. Paris. Recueil de Statistique municipale de la Ville de Paris, 1^ère^ année 1910. No. 1. 8vo. Paris, 1911.

Norway. Statistique des boissons alcooliques: 1. Consommation de l'eau-de-vie, du vin et de la bière en Norvège. 1814 à 1909. ii + 29 pp., 8vo. Christiania, 1910.

United States. Massachusetts. Special Report on Cost of Retirement Systems for State and County Employees in Massachusetts. 101 pp., 8vo. Boston, 1911.

CURRENT NOTES.

The trade returns for the past month appear somewhat less satisfactory, since the month contained three working days fewer than April, 1910. Lower prices also affect the imports to a considerable extent. As compared with April, 1910, there is a decrease of 7,705,244*l*., or 12·9 per cent., in imports, and an increase of 400,241*l*. or 1·1 per cent. in exports. Re-exports show a decrease of 2,369,843*l*., or 11·5 per cent. The figures for the twelve months ending April, 1911, are summarised in the subjoined tables :—

[000's omitted.]

Imports.	Twelve months ending April, 1911.	Twelve months ending April, 1910.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	252,402,	258,475,	− 6,073,
II. Raw materials and articles mainly unmanufactured	267,790,	230,812,	+ 36,978,
III. Articles wholly or mainly manufactured	160,128,	152,399,	+ 7,729,
IV. Miscellaneous and unclassified (including parcel post)	2,546,	2,609,	− 63,
Total merchandise	682,866,	644,295,	+ 38,571,
Imports of bullion and specie	68,874,	63,866,	+ 5,008,

[000's omitted.]

Exports.	Twelve months ending April, 1911.	Twelve months ending April, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	27,048,	24,000,	+ 3,048,
II. Raw materials and articles mainly unmanufactured	53,618,	52,505,	+ 1,113,
III. Articles wholly or mainly manufactured	355,259,	313,144,	+ 42,115,
IV. Miscellaneous and unclassified (including parcel post)	8,425,	7,019,	+ 1,406,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,162,	11,934,	+ 1,228,
II. Raw materials and articles mainly unmanufactured	60,935,	61,034,	− 99,
III. Articles wholly or mainly manufactured	28,143,	25,392,	+ 2,751,
IV. Miscellaneous and unclassified (including parcel post)	201,	287,	− 86,
Total, British, foreign and colonial	546,791,	495,315,	+ 51,476,
Exports of bullion and specie	60,252,	62,108,	− 1,856,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending April, 1911.	Twelve months ending April, 1910.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	42,101,	40,567,	+ 1,534,
Total, British and foreign, *cleared* with cargoes	58,283,	57,016,	+ 1,267,

Mr. Sauerbeck's index number of prices for April, which indicates a further rise, is 80·0, as against 78·9 in March, the average of the eleven years 1867-77 being taken as 100. Metal (tin excepted) and coal, however, were weak. Corn was higher, and potatoes showed a considerable rise. Meat was also dearer, but butter declined, as usual at this time of year. Textiles were better, particularly cotton and jute, but there was no change for "sundry materials" in the aggregate. Articles of food were 74·0, as compared with 72·6 in March, and materials 84·4 as compared with 83·5. Silver showed a slight rise. The *Economist* index number is 2,554, as compared with 2,536 at the end of March, thus showing a rise of 18 points.

According to the Board of Trade's *Labour Gazette*, the state of the labour market during March was as follows :—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
March, 1911................	395	759,605	23,035	3·0
February, 1911	398	757,430	25,030	3·3
March, 1910................	416	701,766	36,543	5·2

Employment continued to improve during March, and was, on the whole, good. As compared with a year ago it was much better, the industries in which the improvement in employment was most marked being tinplate, engineering, shipbuilding, cotton, glass, finishing, and woodworking. Coal-mining showed little change, and in the jute, linen and lace trades there was a decline.

The eighth part of the preliminary tables of the Census of Production [Cd-5621, price 5½*d.*] has been issued. The present tables cover the production of timber factories and workshops, furniture, house furnishings, and upholstery factories and workshops, wooden crate, case, box, and trunk factories and workshops, carriage, cart, and wagon factories and workshops, brush factories and workshops, coopering factories and workshops, basket and wickerwork factories and workshops, fellmongery factories and workshops, saddlery, harness, and cart-gear factories and workshops, travelling bags and leather goods factories and workshops, canvas goods and sack factories and workshops, india-rubber factories and workshops, cement factories and workshops, asbestos and boiler covering factories and workshops, and wigmakers' workshops. Information is also given respecting productive work carried on in the blind and carpet stores of H.M. Office of Works. The gross output (selling value or value of work done) for private factories and workshops is 66,577,000*l.* and for the Office of Works 3,482*l.*, the value of the output for private factories and workshops being calculated on a profit basis, while that of the Office of Works is calculated on the cost of production. The cost of materials used is 37,789,000*l.* and 1,200*l.* respectively, and the amount paid to other firms by the various private factories for work given out is 163,000*l.* The net output, *i.e.*, the excess of the gross output over the cost of materials used and the work given out is 28,625,000*l.* and 2,282*l.* respectively, while the total number of persons employed (except outworkers) is 307,365 and 35. In addition to these numbers, 3,480 outworkers were returned as borne on the books of the employing firms, the largest number being in the brush-making trade (1,577). In the other trades the number of outworkers ranges between 31 and 793.

In answer to a question in the House of Commons, the Lord Advocate issued the statement printed on the following page in regard to the preliminary results of the Scotch Census.

In addition, the population of burghs having 20,000 inhabitants and over is given in a Supplement to the Monthly Returns of the Registrar-General of Scotland, as follows:—

Aberdeen	163,084	Edinburgh	320,315	Leith	80,489
Airdrie	24,388	Falkirk	33,569	Motherwell	40,378
Arbroath	20,645	Glasgow	784,455	Paisley	84,477
Ayr	32,985	Govan	89,725	Partick	66,848
Clydebank	37,547	Greenock	75,160	Perth	35,851
Coatbridge	43,287	Hamilton	38,644	Rutherglen	24,411
Dumbarton	21,989	Inverness	22,216	Stirling	21,200
Dundee	165,002	Kilmarnock	34,729	Wishaw	25,263
Dunfermline	28,103	Kirkcaldy	39,600		

Population of Scotland and of the Civil Counties in 1901 *and* 1911. (Preliminary Report.)

	Population, 1901.			Population, 1911.			Increase.		Decrease.	
	Males.	Females.	Total.	Males.	Females.	Total.	Actual.	Per cent.	Actual.	Per cent.
Scotland	2,173,755	2,298,348	4,472,103	2,307,672	2,451,849	4,759,521	287,418	6·4	—	—
I. Northern—										
1. Shetland	12,413	15,753	28,166	12,588	15,323	27,911	—	—	255	0·9
2. Orkney	14,027	14,672	28,699	12,250	13,646	25,896	—	—	2,803	9·8
3. Caithness	16,072	17,798	33,870	15,160	16,848	32,008	—	—	1,862	5·5
4. Sutherland	10,445	10,995	21,440	9,849	10,331	20,180	—	—	1,260	5·9
II. North-Western—										
5. Ross and Cromarty	36,253	40,197	76,450	38,757	38,596	77,353	903	1·2	—	—
6. Inverness	43,762	46,342	90,104	42,463	44,807	87,270	—	—	2,834	3·1
III. North-Eastern—										
7. Nairn	4,415	4,876	9,291	4,330	4,989	9,319	28	0·3	—	—
8. Elgin (or Moray)	21,101	23,699	44,800	20,492	22,935	43,427	—	—	1,373	3·1
9. Banff	29,359	32,129	61,488	29,760	31,642	61,402	—	—	86	0·1
10. Aberdeen	144,836	159,603	304,439	146,570	164,780	311,350	6,911	2·2	—	—
11. Kincardine	20,079	20,844	40,923	19,755	21,252	41,007	84	0·2	—	—
IV. East-Midland—										
12. Forfar	127,695	156,387	284,082	126,644	154,771	281,415	—	—	2,667	0·9
13. Perth	58,060	65,223	123,283	58,359	65,980	124,339	1,056	0·9	—	—
14. Fife	105,124	113,716	218,840	132,201	135,593	267,794	48,954	22·4	—	—
15. Kinross	3,342	3,639	6,981	3,617	3,911	7,528	517	7·8	—	—
16. Clackmannan	15,195	16,834	32,029	14,656	16,465	31,121	—	—	908	2·8
V. West-Midland—										
17. Stirling	72,773	69,518	142,291	82,345	78,658	161,003	18,712	13·2	—	—
18. Dumbarton	56,598	57,267	113,865	69,720	70,111	139,831	25,966	22·7	—	—
19. Argyll	36,177	37,465	73,642	35,422	35,479	70,901	—	—	2,741	3·7
20. Bute	8,409	10,378	18,787	8,006	10,180	18,186	—	—	601	3·2
VI. South-Western—										
21. Renfrew	130,407	138,573	268,980	151,720	162,874	314,594	45,614	17·0	—	—
22. Ayr	125,269	129,199	254,468	130,221	138,111	268,332	13,864	5·4	—	—
23. Lanark	674,163	665,164	1,339,327	721,533	725,580	1,447,113	107,786	8·0	—	—
VII. South-Eastern—										
24. Linlithgow	35,223	30,485	65,708	42,044	37,412	79,456	13,748	20·9	—	—
25. Edinburgh	230,455	258,341	488,796	235,438	272,224	507,662	18,866	3·9	—	—
26. Haddington	18,839	19,826	38,665	21,446	21,807	43,253	4,588	11·9	—	—
27. Berwick	14,725	16,099	30,824	14,191	15,452	29,643	—	—	1,181	3·8
28. Peebles	7,129	7,937	15,066	7,067	8,191	15,258	192	1·3	—	—
29. Selkirk	10,673	12,683	23,356	11,332	13,268	24,600	1,244	5·3	—	—
VIII. Southern—										
30. Roxburgh	22,349	26,455	48,804	21,583	25,609	47,192	—	—	1,612	3·3
31. Dumfries	34,362	38,209	72,571	35,021	37,803	72,824	253	0·3	—	—
32. Kirkcudbright	18,753	20,630	39,383	18,054	20,309	38,363	—	—	1,020	2·6
33. Wigtown	15,273	17,412	32,685	15,078	16,912	31,990	—	—	695	2·1

These figures should, of course, be regarded as approximate, and subject to corrections after the Census returns have been thoroughly examined.

The Departmental Committee on Accidents in Places under the Factory and Workshop Acts have presented a report which is full of eminently practical suggestions. Incidentally, frequent reference is made in the report to the paucity of relevant statistics, and time after time a line of investigation had to be abandoned because no figures were available. The Committee must in any case have relied very largely on expert opinion; but it was felt that this should have been supported by statistics whenever possible, not because the experts were deemed to be untrustworthy, but in order to attach a quantitative value to their opinions. There appears to be no lack of statistical raw material in the shape of the detailed report of accidents which are furnished to the Home Office by the manufacturers and by the factory surgeons, and of the triennial returns of the number of persons employed, obligatory on the occupiers of factories and workshops, and it is unfortunate that this material is not more thoroughly worked up. It might, for example, be possible, even with the limited staff of the Factory Statistical Department, to deal each year with a single industry, analysing the accident returns according to age, sex, nature and degree of injury, time of day, week and year, and in all other ways relevant to the ultimate purpose of preventing accidents; and collating the figures so obtained with the numbers of persons employed in the industry, and with indices representing the fluctuating activity of trade. Failing such guidance, legislative and administrative effort may easily be spent in directions where it is least needed. Statistical investigation of the effect on the accident rate in particular industries of payment by the piece, of fatigue due to long hours of labour, of the speeding-up of machinery, of the inexperience of youthful workers, and the carelessness of others, and similar subjects would probably well repay the trouble involved. Many pages of the Report are devoted to the question of how far the practice of cleaning machinery in motion, common in textile mills, should be permitted, the technical difficulties being aggravated by the absence of any adequate statistical analysis. The Committee conclude that much of the apparent increase in accidents is due to fuller reporting, the result of improved inspection, and the Workmen's Compensation Act. There are sudden increases of the accident rate in years of booming trade, followed by falls to the normal, or below it, in years of declining trade, but in a long period average these cancel out. No attempt is made to measure the relative importance of these factors.

In that part of the Report which deals with the Prevention of Accidents, attention is directed to the need of amending the law relating to the fencing and cleaning of dangerous machinery, and it is pointed out that sufficient use is not made of the power possessed by the Home Office of scheduling particular processes or classes of machinery as dangerous, and setting up codes of special regulations with the object of minimising the risk of accident. Emphasis is laid on the fact that the bulk of machinery (to which most preventable accidents may be attributed) can be classified by trades, machinery in different establishments belonging to the same trade being identical, or closely similar. Much of what cannot be classified by trades falls into other categories, *e.g.*, hoisting machinery, electrical machinery; the last mentioned being already subject to special regulations. It is urged that detailed special regulations should be applied to all such classes and categories, and that the residue of machinery which defies classification should be dealt with by a general clause in the Act of Parliament.

A Parliamentary Paper has been issued under the title: "Statement with regard to persons in receipt of Poor Law relief on "December 31, 1910, who received Old Age Pensions and ceased "to be chargeable to Guardians during the four weeks ended "January 28, 1911." It is pointed out that as from January 1, 1911, persons were no longer disqualified from becoming, or being, old age pensioners by reason of having received Poor Law relief at some time since January 1, 1908. Owing to the discontinuance of this disqualification a large number of persons (especially outdoor paupers) ceased to be chargeable during the month of January. The subjoined table shows the number of persons in receipt of Poor Law relief on December 31, 1910, who, according to special returns obtained from Boards of Guardians, received old age pensions and ceased to be chargeable to during the four weeks ended January 28, 1911 :—

England and Wales.

	Men.	Women.	Total.
Persons who were in-door paupers—			
70 years of age on December 31, 1910....	3,650*	1,386*	5,036*
,, subsequently....................	28	13	41
Totals	3,678	1,399	5,077
Persons who were out-door paupers—			
70 years of age on December 31, 1910....	31,562	85,004	116,566
,, subsequently....................	197	575	772
Totals	31,759	85,579	117,338
Totals of in-door and out-door....	35,437	86,978	122,415

* The numbers of persons who were in-door paupers, 70 years of age on December 31, 1910, include 14 persons (7 men and 7 women) who had received relief at the cost of the poor rate in institutions not provided by poor law authorities.

The saving to the rates resulting from the total number of 122,415 paupers (in-door and out-door) having become pensioners in January, 1911, is put down at about 21,951*l.* a week, but it is stated that this estimate is necessarily subject to certain qualifications.

The first report has been issued of the Standing Committee on Boy Labour in the Post Office [Cd–5504, price 2½*d.*]. The terms of reference of the Committee, of which Sir Matthew Nathan is chairman, include the consideration of measures for a reduction in the number of boy messengers by substituting other labour for that of boys, by greater use of electrical and mechanical appliances, and by economy of numbers. Measures are also to be considered for the absorption of a greater number into the Post Office or other Departments of State by lessening numbers taken into the Post Office by open competition, and by arranging with the War Office and Admiralty that special opportunities should be given to ex-messengers to enter the more attractive branches of the military and naval services. Lastly, attention is to be directed to increasing chances of outside employment by improving education, by utilising labour bureaux, philanthropic societies and other institutions, and by arranging for apprenticeship. Before dealing in detail with the administrative arrangements resulting from their recommendations, which will be dealt with in a later report, the Committee desire to obtain the approval of the Postmaster-General to their general proposals for reducing the establishment of boys, and in other respects carrying out the terms of their reference. The number of boys employed on September 30, 1910, was 3,801 in London and 11,617 in the provinces; the reductions effected since March 31, 1910, are 94 in London and 179 in the provinces. It is estimated that under the proposals now under consideration a further reduction could be effected of 225 in London and 943 in the provinces. At the same time some increase may be looked for in the number of appointments within the Post Office service for which boy messengers will, if the recommendations of the Committee are accepted, be eligible in future. During 1909 1,615 messengers obtained such situations, but it is estimated that as a result of the various schemes already adopted or under consideration, about 1,900 boys can be provided for annually with the service.

The *Philosophical Magazine* for April contains an article entitled "A Problem in Age-Distribution," by Mr. A. J. Lotka and Dr. F. R. Sharpe, in continuation of a paper contributed by Mr. Lotka to the *American Journal of Science*, vol. xxiv (1907), on

"Studies on the Mode of Growth of Material Aggregates." Part of this was devoted to a theoretical investigation of the age-distribution and other properties of a human community. It was shown that if the age-distribution is assumed to be of a fixed form, and if the effects of immigration and emigration are negligible, a knowledge of the "life-table" alone is sufficient to determine theoretical values for the birth-rate, death-rate, and age-distribution. For England and Wales, during the decade 1871-80, these values agreed closely with those observed, as the following table shows:—

	Observed.	Calculated.		Observed.	Calculated.
Birth-rate per head	0·03546	0·0352	Age—		
Death-rate „	0·02139	0·0211	35—45	113	116
Age—			45—55	86	87
0—5	136	138	55—65	59	59
5—10	120	116	65—75	33	33
10—15	107	106	Over 75	13	13
15—20	97	97			
20—25	89	87			
25—35	147	148	Total	1,000	1,000

The later article investigates whether the "fixed" form of the age-distribution found in the earlier paper is also a "stable" one, *i.e.*, whether a given population will spontaneously return to this fixed distribution after a small displacement therefrom. The authors ascertain what would be the age-distribution at any time, when that at some previous instant is known and the "life-table" and data of procreation are available. Some complex mathematics is involved in the solution of the problem, but the conclusion is reached that the "fixed" age-distribution is a "stable" one. If, therefore, through a temporary disturbance of otherwise constant conditions (for example, the elimination of an appreciable number of adult males by war) the age-distribution is altered, it will quickly return to its previous form.

We have received from Mr. G. H. Knibbs, Commonwealth Statistician, a copy of a Paper he has published under the title "Studies in statistical representation: on the nature and computation of the curve $y = Ax^m e^{nx^p}$" (*Journal of the Royal Society of New South Wales*, vol. xliv, 1911). The curve is an extremely flexible one, capable of taking a great variety of forms, including the normal curve of errors and forms resembling Professor Pearson's frequency curves, but the mathematical treatment does not appear to be very convenient. Practical methods of fitting are suggested, based on the selection of groups of four ordinates and the averaging of the results obtained from the different groups: no actual examples of fitting are shown, but a number of figures illustrate the forms that the equation can give, and the properties of the curve are studied in detail.

In the *Proceedings of the Royal Society of Edinburgh*, vol. xxxi, p. 262, Dr. John Brownlee returns to the problem of the distribution of an epidemic in space and time, a problem which he had also considered on a previous occasion (*ibid.* June, 1906). The distribution of an epidemic in space depends fundamentally on the solution given by Professor Pearson for the problem of "Random Migration" (Dulau and Co., 1906), for the distance from which friends come to visit a sick person, or the distance a sick person travels while developing the disease, determines the subsequent appearance of cases. To a first approximation, the distribution is given by a normal surface, in which x and y are, of course, independent, and the standard deviation is proportional to the average distance of travel. Dr. Brownlee now considers the effect on the ultimate distribution if (1) the source of infection be taken to cover a certain area, and not as a point; and (2) if the mean travel be not regarded as uniform. In his previous memoir the author also showed that, if the infectivity of the disease might be assumed to die out at a uniform rate, the distribution of the number of cases with time followed the normal law; he now takes into account the effect on the distribution of supposing that there are a number of different infectivities which die out at different rates. At the conclusion of the Paper are given some exceedingly interesting examples of the theory of migration as applied to animals and plants. In one case a number of water fleas (*Daphnia pulex*) were released from a tube in the centre of a flat dish and instantaneously photographed at a suitable moment; the results showed a very close concordance with theory. The distributions of hawkbits (*Apargia hispida*) from a sloping bank on to terraces, where they were prevented from seeding owing to continual mowing, affords an example of migration from an area bounded by a straight line, and again the concordance with theory is as close as could be expected.

We have received from M. Joseph Lottin a reprint of three articles, under the general title of "Les régularités statistiques: un "chapitre de la logique inductive," which he has contributed to the *Revue Néo-Scolastique de Philosophie.* The first article deals with the philosophical theory of the mean, and the application of means in the sciences of observation. M. Lottin emphasises the importance of the distinction between the objective mean—the approximate value of a really existing magnitude—and the subjective mean, the synthesis of several distinct magnitudes, a distinction on which Quetelet so frequently insisted. The tendency to assimilate the the latter to the former and to argue as to the constancy of the mean in the future will, in general, be unjustified. In the second article on "Le calcul des probabilités et les régularités statistiques," M. Lottin considers the deduction of the law of large numbers from the hypothesis of a constant cause with accidental causes superposed thereon, and from the hypothesis of variable common causes respectively: the mere observation of convergence towards a mean does not enable us to differentiate between these two hypotheses. In the concluding article "Le concept de loi dans les régularités "statistiques" is discussed. Historically, M. Lottin concludes, the method of statistics appears as an application of the theory of probabilities to the phenomena of nature: logically, it is related to the method of induction, of which it constitutes, in fact, the preliminary stage.

A translation of the new Swedish Customs Tariff Law, which comes into force on December 1, 1911, has been prepared and ssued by the Board of Trade [Cd–5464, price $9\frac{1}{2}d$.]. The establishment of the new tariff will synchronise with the expiration of the existing commercial treaty between Sweden and Germany, by which a considerable number of the rates of duty leviable under the present Swedish tariff are "conventionalised." The classification of articles adopted in the new tariff differs considerably from that of the existing tariff, and the rates of duty now in force on the articles as classified in the new tariff are shown in this return as far as possible for purposes of comparison.

It is announced that Mr. Edgar J. Harper has resigned his position as Statistical Officer to the London County Council.

In view of the arrangements which have been made for the Coronation, it has been decided by the Council to alter the date of the June Ordinary Meeting from June 20 to June 13. At this Meeting, which will be held at 5.30 p.m., at the Rooms of the Royal Society of Arts, Sir J. A. Baines, C.S.I., Honorary Vice-President, will read a short Paper entitled "Under the Crown." On the same day, at 4 p.m., the President and the Council and Officers of the Society will be "At Home" to Fellows and their friends at the Society's House. A display of calculating machines and other mechanical appliances of interest to those engaged in statistical work has been arranged for the occasion. The annual General Meeting will take place on June 15.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Accountant, 1911—

April 8—"Debentures," or a criticism of floating charges, with special reference to the report of the Company Law Amendment Committee: *Gibson* (*J. Grant*).

April 29—Accountants' work under the Public Trustee Act: *Stewart* (*C. J.*). Reserves, annuities, and sinking funds: *Spicer* (*Ernest Evan*).

May 6—Balance sheet values and reserve funds: *Hamilton* (*W. R.*).

Accountants' Magazine. May, 1911—School Board audits: *Charlton* (*F. F.*).

Bankers' Magazine. May, 1911—Progress of banking in Great Britain and Ireland during 1910. No. 4. Proportion of cash to deposits. The Indian currency. Canadian banking, 1910. Gold reserves: internal and external views.

Financial Review of Reviews. May, 1911—International crises and the price of Consols: *Hill* (*The Right Hon. Viscount*). Professional men and their investments: *Lowenfeld* (*Henry*). The legal position of British investors in Russia: *Heyking* (*His Excellency Baron A.*). How women may achieve investment success.

Journal of the Board of Agriculture. April, 1911—The Burwell small holdings after four years of tenancy: *Diggle* (*J. H.*). Osier and willow cultivation: *Ellmore* (*W. Paulgrave*) and *Okey* (*Thomas*). Inquiry into methods of sampling milk.

Journal of the Institute of Actuaries. April, 1911—On the valuation of the liabilities of an insurance company under its employers' liability contracts: *Penman* (*William*). On staff pension funds: the progress of the accumulation of the funds; the identity of a valuation with the future progress of a fund; the manner of dealing with funds which are insolvent; and sundry observations: *Manly* (*Henry W.*). Note on accumulation formulas: *Thomas* (*E. C.*). Departmental committee on superannuation funds of railway companies. Tables put in by: *Hardy* (*G. F.*). Legal notes: *Barrand* (*Arthur Rhys*). Note on stamp duties: *Robertson* (*J. L.*).

Journal of the Institute of Bankers. May, 1911—Gilbart lectures, 1911: *Paget* (*Sir John*). The continued increase of dividend coupons, with a proposal for a system of clearing: *Pannett* (*H. H.*).

Public Health. May, 1911—The treatment of phthisis by industrial insurance, with special reference to the Benenden Sanatorium: *Lister* (*T. D.*). Methods of calculating mid-year populations: *Mostyn* (*S. G.*). The notification of still-births: *Lyster* (*R. A.*).

Surveyors' Institution. Transactions. Session 1910-11. *Vol.* 43. *Part* 9—Annual licence value: *Dinwiddy* (*Donald*).

UNITED KINGDOM—*Contd.*

United Empire. (*Royal Colonial Institute Journal.*) 1911—

April—Empire trade relations: *Morgan* (*Ben H.*).

May—Sierra Leone and its commercial expansion. Part 1: *Alldridge* (*T. J.*). The Universities of Australia: *Inglis* (*Gordon*). Newfoundland and the naval movement in Canada: *McGrath* (*P. T.*).

UNITED STATES—

Bulletin of the Bureau of Labor. No. 91. *November*, 1910—Working hours of wage-earning women in selected industries in Chicago: *Obenauer* (*Marie L.*). Labor laws declared unconstitutional: *Clark* (*Lindley D.*). Old-age and invalidity pension laws of Germany, France and Australia. Review of labor legislation of 1910: *Clark* (*Lindley D.*). Laws of various states relating to labor enacted since January 1, 1910. Cumulative index of labor laws and decisions relating thereto.

Journal of Political Economy. April, 1911—The state debt of Ohio: *Bogart* (*Ernest L.*). Rates of interest and the prices of investment securities, 1890-1909: *Mitchell* (*Wesley C.*). The social-economic classes of the population of the United States. 11: *Hourwich* (*Isaac A.*). Magazine advertising and the postal deficit: *Haney* (*Lewis H.*).

FRANCE—

Bulletin de Statistique, Ministère des Finances. March, 1911—Produits des contributions indirectes pendant l'année 1910. Les recettes des théâtres et spectacles de Paris en 1910. Allemagne.—L'Impôt sur la plus-value immobilière. (Loi du 14 Février 1911.) Allemagne.—La banque de l'empire en 1910.

Journal des Economistes. April, 1911—La capture et l'échange: *Guyot* (*Yves*). Législation protectrice du sol montagneux en France: *Fabre* (*L. A.*). Le système de banque en Angleterre: *Raffalovich* (*A.*). L'Influence des primes sur une industrie et une colonie françaises: *Bellet* (*Daniel*). La conférence de Washington de mai 1911: *Jacq* (*Fernand*). La loi sur les retraites ouvrières et paysannes. Les mesures préparatoires d'application: *Bellom* (*Maurice*). Le XV^{e} congrès de crédit populaire: *François* (*G.*).

Journal de la Société de Statistique de Paris. April, 1911—Rapport du trésorier sur les comptes de l'année 1910, la situation financière et le budget de 1911: *Matrat* (*Paul*). Les chemineaux de l'épargne: *Neymarck* (*Alfred*).

La Réforme Sociale, 1911—

April 16—La crise des œuvres charitables: *Cilleuls* (*Alfred des*). Le travail à domicile: *Hans* (*Pierre*). Ce qu' on peut attendre du contrat collectif: *Bureau* (*P.*).

May 1—L'Association à but économique appliquée à l'organisation des classes moyennes: *Dufourmantelle* (*Maurice*). Les types sociaux de simple récolte et d'extraction dans la région parisienne: *Charpin* (*Frédéric*). La mouvement économique et social. Pays de langue française: *Lepelletier* (*F.*).

GERMANY—

Archiv für Sozialwissenschaft und Socialpolitik. *March*, 1911—Ueber den Rückgang der Geburten- und Sterbeziffer: *Oldenberg* (*Prof. K.*). Das Gesetz des abnehmenden Bodenertrages. Positive Darstellung: *Esslen* (*Prof. Joseph*). Das Polizeirecht in den Vereinigten Staaten: *Hatscheck* (*Prof. Julius*). Arbeit und Arbeitsbetrieb in den österreichischen Strafanstalten: *Herz* (*Prof. Hugo*). Ueber die Arbeitsmittel zur Herstellung bibliographischer und historischer Schriften über die moderne Arbeiterbewegung: *Michels* (*Prof. Robert*). Das philosophisch-ökonomische System des Marxismus: *Vorländer* (*Prof. Karl*). Die deutschen Gewerkschaften im Jahre 1910.

Deutsches Statistisches Zentralblatt. *April*, 1911—Staatswissenschaftliche Forschungsinstitute: *Schmid* (*Dr. Ferdinand*).

Jahrbücher für Nationalökonomie und Statistik (*Conrad's*). *April*, 1911—Das Progressionsprinzip in der Besteuerung: *Schönheyder* (*K.*). Der Ausbau des Arbeitsnachweises: *Wolff* (*Hellmuth*). Der neueste Stand des deutschen Genossenschaftswesens: *Abelsdorff* (*Walter*). Der Anteil der verschiedenen privaten Unternehmungsformen und der öffentlichen Betriebe am deutschen Wirtschaftsleben: *Passow* (*Richard*). Neuere Schriften über das Geldwesen: *Lexis* (*W.*).

Zeitschrift für Socialwissenschaft. *Heft* 4. 1911—Kritische Betrachtungen über den Aufbau unserer gewerblichen Betriebsstatistik (*continued in next issue, Heft* 5, 1911): *Passow* (*R.*). Die Wertung des Luxus (*continued in next issue, Heft* 5, 1911): *Mayer* (*Adolf*). Wirtschaft und Recht (*continued in next issue, Heft* 5, 1911): *Voigt* (*A.*). Beiträge zur Geldtheorie. Die Erfordernisse des Geldes (*continued in next issue, Heft* 5, 1911): *Heyn* (*O.*).

Zeitschrift für Versicherungs-Wissenschaft. *May*, 1911—Der Selbstmord als mitversichertes Ereignis der Todesfallversicherung: *Rothauge* (*Dr.*). Die Sterblichkeits- und Invaliditätsverhältnisse des Lokomotivpersonals deutscher Eisenbahnen: *Braun* (—). Die Frage der Unanfechtbarkeit der Seeversicherungstaxe: *Rehm* (*Prof.*). Die Kriegsversicherung bei den öffentlichen Feuerversicherungsanstalten der deutschen Bundestaaten: *Wehberg* (*Dr.*). Die Normativbedingungen in der Haftpflichtversicherung und das Versicherungsvertragsgesetz: *Unfried* (—). Zur Frage des Anlagezwangs der Versicherungsgesellschaften: *Mueller* (*Dr.*). Die deutsche Steuergesetzgebung seit 1906 in ihrer Bedeutung für die Privatversicherung: *Wertheimer* (*Dr.*).

ITALY—

Giornale degli Economisti e Rivista di Statistica. *March*, 1911—L'Economia e la meccanica: *De Ruggiero* (*G.*). La classe contadina in Russia e le sue condizioni economico sociali: *Nina* (*L.*). Uno studio ufficiale del commercio estero italiano: *Giretti* (*E.*). La questione delle trebbiatrici a Ravenna: *Caroncini* (*A.*).

La Riforma Sociale. *March-April*, 1911—Fiscalismo sociale ed acqua potabile: *Einaudi* (*Luigi*). Per una legge sulla caccia: *Roncali* (*A.*). Lo studio della contabilità di stato nelle università italiane: *Garelli* (*A.*).

LIST OF ADDITIONS TO THE LIBRARY.

During the month ended May 8, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Argentine Republic—

Agriculture. Superficie, Poblacion, Ferro-Carriles, Cultivos y Ganados. Resumen general. Map, folded. 1911. (The Ministry of Agriculture.)

Bulgaria—

Census. Résultats préliminaires du Recensement général, 31 Décembre 1910. Nombres de la population par localités. 4to. 1911. (The Director-General of Statistics.)

Elections. Statistique des élections des députés pour la xiv-ème Assemblée nationale ordinaire. 4to. 1910. (*Id.*)

Denmark—

Agriculture. L'Agriculture en Danemark depuis le milieu du 19^{e} Siècle. 4to. 1911. (The State Statistical Bureau.)

France—

Paris. Recueil de Statistique municipale de la Ville de Paris, 1910. No. 1. 1er Année. 8vo. 1911. (The Municipal Statistical Bureau.)

Germany—

Die Branntweinbrennerei und Branntweinbesteuerung . . . während 1909-10. 4to. 1911. (The Imperial Statistical Bureau.)

Veröffentlichungen des Reichskolonialamtes. Nr. 1. Die Baumwollfrage. Denkschrift über Produktion und Verbrauch von Baumwolle Massnahmen gegen die Baumwollnot. viii + 341 pp., 8vo. 1911. (Purchased.)

Baden. Statistisches Jahrbuch für das Grossherzogthum Baden. 1895-1903. 1906-1909. 9 vols., la. 8vo. 1897-1909. (The Statistical Bureau.)

Hungary—

Births, &c. Mouvement de la population dans les Pays de la Sainte Couronne Hongroise en 1906, 1907 et 1908. 8vo. 1910. (The Central Statistical Bureau.)

Luxemburg, Grand Duchy of—

Berufs- und Gewerbezählung, 1907. Band 1, Gewerbliche Betriebsstatistik. 1. Zahl der Gewerbebetriebe und der darin beschäftigten Personen. 8vo. 1910. (Major P. G. Craigie.)

Netherlands—

Agriculture. Verslag over den Landbouw in Nederland over 1906 und 1908. 2 vols., 8vo. 1909. (Mr. B. C. Wallis.)

—— Veetelling 1910. Beknopt Verslag der van 20 Mei–20 Juni 1910 gehouden Veetelling. 8vo. 1910. (*Id.*)

Census. Résultats du neuvième recensement de la population au 31 décembre 1909. Première Partie. 4to. 1910. (The Central Statistical Bureau.)

Norway—

Alcoholic beverages. Statistique des boissons alcooliques: 1. Consommation de l'eau-de-vie, du vin et de la bière en Norvège. 1814 à 1909. (Nr. 124.) 8vo. 1910. (The Central Statistical Bureau.)

Births, &c. Mouvement de la population pendant 1901 à 1905. Résumé pour la période quinquennale 1901 à 1905. (Nr. 123.) 8vo. 1910. (*Id.*)

(a) Foreign Countries—*Contd.*

Russia—

Finland—

Births, &c. Mouvement de la Population de Finlande en 1907 et 1908. 8vo. 1910. (The Central Statistical Bureau.)

Elections. Élections pour la Diète en 1909. 8vo. 1910. (*Id.*)

Switzerland—

Census. Résultats du recensement fédéral des entreprises agricoles, industrielles et commerciales, 1905. Vol. 1. Les entreprises et le nombre des personnes actives dans ces entreprises. 8ᵉ fasc. Suisse et Cantons. 4to. 1908. (Mr. A. D. Webb.)

United States—

Census Bureau. Special Reports. Statistics of Cities having a population of over 30,000: 1908. 4to. 1910. (The Bureau.)

Labour. Report on Condition of Woman and Child Wage-Earners in the United States. In 19 volumes. Vol. III. Glass industry. (Senate Doc. No. 645.) 8vo. 1911. (The Department of Commerce and Labour.)

Mineral Products of the United States. Calendar years 1900-09. Sheet. 1911. (The U.S. Geological Survey.)

Connecticut. Labour. 24th Report of Bureau of Labor Statistics, for two years ended November 30, 1910. 8vo. 1910. (The Bureau.)

Massachusetts. Special Report on Cost of Retirement Systems for State and County Employees in Massachusetts. 101 pp., 8vo. 1911. (The Bureau of Statistics.)

Minnesota. 12th Biennial Report of Bureau of Labor, Industries and Commerce for 1909-10. 8vo. 1911. (The Commissioner of Labor)

Boston. Finance. Special Publications. No. 17. Receipts and Expenditures of Ordinary Revenue, 1905-09. 4to. 1910. (The Statistics Department.)

(b) India and Colonies.

Australia, Commonwealth of—

Western Australia. Statistical view of eighty-one years' progress in Western Australia, 1829-1909. 11 pp., fol. 1911. (The Registrar-General.)

Canada, Dominion of—

Census. Fifth Census of Canada, 1911. Instructions to Officers, Commissioners and Enumerators. [With translation in French.] 8vo. 1911. (The Census and Statistics Office.)

—— Supplements to Canada Gazette, 1910, containing Proclamations as to the census and the forms to be used. Fol. 1910. (*Id.*)

(c) United Kingdom and its several Divisions.

United Kingdom—

Accidents. Report of Departmental Committee on Accidents in places under the Factory and Workshops Acts. [Cd-5535.] 1911. (Purchased.)

—— Report of Departmental Committee on Rescue and Aid in case of Accidents in Mines. [Cd-5550.] 1911. (*Id.*)

Canada. Tariff relations between United States and Dominion of Canada. [Cd-5516.] 1911. (*Id.*)

Canada and United States. Reports from His Majesty's Ambassador at Washington respecting a Reciprocal Tariff Arrangement between Canada and the United States. [Cd-5523.] 1911. (*Id.*)

Census of Production (1907). Preliminary Tables Summarising Results of Returns received under the Act, 1906. Part viii. [Cd-5621.] 1911. (The Census of Production Office.)

Colonial Reports. No. 75. The Imperial Department of Agriculture in the West Indies. [Cd-5515.] 15 pp., 8vo. 1911. (Purchased.)

(c) **United Kingdom and its several Divisions**—*Contd.*

United Kingdom—*Contd.*

Cost of Living in American Towns. Report of Inquiry by Board of Trade into Working Class Rents, Housing and Retail Prices, Rates of Wages in certain occupations in the Principal Industrial Towns of the United States of America. With Introductory Memorandum and a Comparison of Conditions in the United States and the United Kingdom. [Cd-5609.] 1911. (The Labour Department, Board of Trade.)

Payment of Members (British Dominions). (80.) 1911. (Purchased.)

Poor. Royal Commission on Poor Laws and Relief of Distress. Appendix Vol. 34. Alphabetical lists of oral and non-oral witnesses. [Cd-5442.] 1911. (The Commission.)

Post Office. First Report of Standing Committee on Boy Labour in Post Office, with instructions by Postmaster-General in connection therewith. [Cd-5504.] 1911. (Purchased.)

Public Accounts Committee. Copy "of Epitome of Reports from Committees of Public Accounts, 1857 to 1910, and of Treasury Minutes thereon, with Index." (36.) 8vo. 1911. (*Id.*)

Referendum. Reports from His Majesty's Representatives abroad respecting the Institution known as the Referendum. [Cd-5522.] 1910. (*Id.*)

Religion. Royal Commission on Church of England and other Religious bodies in Wales and Monmouthshire. Vol. vi. Appendices to Minutes of Evidence. Nonconformist County Statistics. [Cd-5437.] 1911. (The Commission.)

Sweden. Translation of New Swedish Customs Tariff Law, to come into force from December 1, 1911; with comparison of new and existing rates of duty. [Cd-5464.] 1911. (Purchased.)

Telephones. Charges, number of miles of lines, and revenue and expenditure in each country of Europe. (316.) 1911. (*Id.*)

Trade Marks. Reports from His Majesty's Representatives abroad on Laws in force in principal Foreign Countries to prevent sale or importation of goods bearing a false indication of origin. [Cd-5531.] 8vo. 1911. (*Id.*)

Great Britain—

Journal of Board of Agriculture. General Index, Vols. i—x, September, 1894, to March, 1904. Vols. xi—xvii, April, 1904, to March, 1911. 2 vols., 8vo. 1911. (The Board of Agriculture.)

England and Wales—

Local Government Board. 39th Annual Report of Local Government Board, 1909-10. Supplement containing Report on Shellfish other than oysters in relation to disease. By H. T. Bulstrode, M.D., with introduction by the Medical Officer of the Board. [Cd-5313.] 8vo. 1911. (The Board.)

Poor Relief. Statement with regard to persons in receipt of Poor Law Relief on December 31, 1910, who received Old Age Pensions and ceased to be chargeable to Guardians during the four weeks ended January 28, 1911. [Cd-5612.] 1911. (Purchased.)

Scotland—

Agriculture and Live Stock. Minutes of Evidence taken before Departmental Committee on Work of Congested Districts (Scotland) Commissioners for Improvement of Agriculture and Live Stock. [Cd-5509.] 1911. (Purchased.)

Census. The Population of Scotland, of each Civil County, and of Burghs of 20,000 inhabitants and over, on April 2, 1911. Supplement to Monthly Returns of Registrar-General of Scotland. 1911. 3 pp., 8vo. 1911. (The Registrar-General.)

(d) **Authors, &c.**

Ampère (*A. M.*). Considérations sur la Théorie Mathématique du Jeu. 63 pp., sm. 4to. Lyon, 1802. (Mr. G. Udny Yule.)

Baab (*August*). Zur Frage der Arbeitslosenversicherung, der Arbeitsvermittelung und der Arbeitsbeschaffung. vii + 389 pp., 8vo. Leipzig, 1911. (Purchased.)

(d) **Authors, &c.**—*Contd.*

Bois (*Joseph*). Le Socialisme et la Conquête des Paysans. A travers les campagnes Bourbonnaises. 116 pp., sm. 8vo. Paris, 1911. (Marcel Rivière et Cie.)

Fisher (*Irving*). The purchasing power of money, its determination and relation to credit, interest and crises. xxii + 505 pp., 8vo. New York, 1911. (Macmillan and Co.)

Frankel (*Lee K.*) and *Dawson* (*Miles M.*). Workingmen's Insurance in Europe. Russell Sage Foundation. 8vo. New York, 1910. (The Charities Publication Committee.)

Gibbon (*I. G.*). Unemployment insurance, a study of schemes of assisted insurance. A record of research in the University of London, with preface by Professor L. T. Hobhouse. 354 + 27 pp., 8vo. 1911. (P. S. King and Son).

Graham (*William*). The One Pound Note in the history of banking in Great Britain. (Second edition). xv + 410 pp., 8vo. Edinburgh, 1911. (James Thin.)

Groschio (*M. Ioanne Andrea*). Logica Probabilivm in Artivm Practicarvm Svbsidivm Adornata. 352 pp., sm. 8vo. Halae Magdebvrgicae, 1764. (Mr. G. Udny Yule.)

Harris (*G. Montagu*). Problems of Local Government. ix + 464 pp., 8vo. London, 1911. (P. S. King and Son.)

Heron (*David*). Mental Defect, Mal-Nutrition, and the Teacher's Appreciation of Intelligence. A reply to criticisms of the Memoir on "The Influence of Defective Physique and Unfavourable Home Environment on the Intelligence of School Children." 34 pp., 8vo. 1911. (The Author.)

Hirst (*F. W.*). The Stock Exchange. A short study of investment and speculation. 256 pp., 8vo. London, 1911. (Williams and Norgate.)

Hogg (*James*, jun.). The Business Man's Note-book and Desk Directory for the year 1857. vi + 792 pp., sm. 8vo. Edinburgh, 1856. (Mr. Godfrey J. Hogg.)

Holdich (*Col. Sir Thomas H.*), K.C.M.G., &c. The Countries of the King's Award. [Argentina and Chile.] Edition de Luxe. 4to. London, 1904. (His Excellency the Argentine Minister.)

Hopkins (*Captain L. E.*). (Editor.) The Universal Railway Manual. Containing valuations of the principal British, American and Foreign Railway Stocks. viii + 591 pp., charts, &c., 8vo. London, 1911. (The Society of Railway Stockholders.)

Jackson (*Edward*). A Study in Democracy: being an account of the rise and progress of industrial co-operation in Bristol. xvi + 606 pp., 8vo. Manchester, 1911. (The Author.)

James (*A. F. Brodie*). Nitrate Facts and Figures, 1911. Eighth year of issue 12 pp., 8vo. London, 1911. (The Compiler.)

James (*J. A. Barbour*). The Agricultural and other Industrial Possibilities of the Gold Coast. With which are included Extracts of the Reports of the Agricultural Exhibitions held at Accra, Cape Coast Castle, Sekondi, and Coomassie. 109 pp., 8vo. London, 1911. (The Author.)

[*Kahle*] *Kahlii* (*M. Lvd. Mart*). Elementa logicae probabilivm methodo mathematica in vsv scientiarvm et vitae adornata. xxii + 245 pp. Halae Magdebvrgicae, 1735. (Mr. G. Udny Yule.)

Knibbs (*G. H.*). Studies in Statistical Representation. On the nature of the curve $y = Ax^m e^{nx^p}$. Commonwealth Bureau of Census and Statistics, Melbourne. 8vo. 1910. (The Commonwealth Bureau.)

Lawson (*W. R.*). Canada and the Empire. viii + 420 pp., 8vo. Edinburgh, 1911. (The Author.)

Le Rossignol (*James Edward*) and *Stewart* (*William Downie*). State socialism in New Zealand. ix + 311 pp., 8vo. London, 1911. (G. G. Harrap and Co.)

Levy (*Hermann*). Large and small holdings. A study of English agricultural economics. Translated by Ruth Kenyon with considerable additions by the author. viii + 249 pp., 8vo. Cambridge, 1911. (The Cambridge University Press.)

(d) Authors, &c.—*Contd.*

Lewinski-Corwin (*Edward H.*). Workmen's Insurance in Belgium. 122 pp., 8vo. New York, 1911. (The Author.)

Murray (*J. Alan*), B.Sc. The Economy of Food. A popular treatise on Nutrition, Food and Diet. xii + 253 pp., 8vo. London, 1911. (Constable and Co., Ltd.)

Neymarck (*Alfred*). Finances Contemporaines. Vols. vi and vii. L'Épargne Française et les Valeurs Mobilières 1872-1910. 2 vols., 8vo. Paris, 1911. (Purchased.)

Prato (*G.*). La Dogane interne nel secolo XX. Il mercantilismo municipale. (Supplement to "La Riforma Sociale." Mar.-April, 1911.) 58 pp., 8vo. 1911. (The Editor, "La Riforma Sociale.")

Rozenraad (*C.*). Table comparing Gold and Silver Stock of principal European banks of issue, their bank rate, the rate of exchange on London and price of different Government Stocks at end of March, 1910, and March, 1911. Sheet fol. 1911. (The Compiler.)

Schmidt (*Arno*). Statistics of stocks of cotton in spinners' hands on March 1, 1911, with previous years' tables for comparison. 12 pp., 8vo. 1911. (The Author.)

Seligman (*E. R. A.*). Théorie de la répercussion et de l'incidence de l'impôt. Traduction française d'après la troisième edition américaine par Louis Suret. 551 + 16 pp., 8vo. Paris, 1910. (Giard and Brière.)

Stewart (*C. Hunter*, M.B., D.Sc.). The Sex and Age Incidence of Mortality from Pulmonary Tuberculosis in Scotland and in its Groups of Registration Districts since 1861. (Reprint from Proceedings of Royal Society of Edinburgh. Session 1910-11. Vol. 31. Part 3. No. 22.) 8vo. Edinburgh, 1911. (The Author.)

Thomson (*William*). Dictionary of Banking. A concise Encyclopædia of Banking Law and Practice. vii + 554 pp., la. 8vo. 1911. (Sir Isaac Pitman and Sons.)

Wateridge (*F. W.*). Prosperous agriculture and home life. What it means to the nation. 263 pp., 8vo. 1911. (Swan Sonnenschein and Co.)

Webb (*A. D.*), B.Sc. The New Dictionary of Statistics. A complement to the fourth edition of Mulhall's "Dictionary of Statistics." 682 pp., 8vo. London, 1911. (The Author.)

Wickens (*Chas. H.*) Professional Paper on Census Taking. Commonwealth Bureau of Census and Statistics. Melbourne. 16 pp., 8vo. 1911. (The Commonwealth Bureau).

Wynne (*R. V.*). An ideal tariff and the constitution. xii + 113 pp., 8vo. London, 1911. (P. S. King and Son.)

Zeuner (*Dr. Gustav*). Abhandlungen aus der Mathematischen Statistik. Mit 27 in den Text eingedruckten Holzstichen und mehrenen Tabellen. viii + 220 pp., 8vo. Leipzig, 1869. (Mr. J. M. Keynes.)

(e) Societies, &c., British.

Tariff Commission. Most-Favoured-Nation arrangements in relation to the proposed reciprocal trade agreement between Canada and the United States of America. 13 pp., 4to. 1911. (The Commission.)

Vol. LXXIV.] [Part VII.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

JUNE, 1911.

On the USE *of the* "NORMAL CROP" *as a* STANDARD *in* CROP REPORTS.

By H. D. VIGOR, B.Sc.

[Read before the Royal Statistical Society, May 16, 1911, the President, the Right Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.]

Introductory.

THE subject of crop reporting was last brought before the Royal Statistical Society in a Paper contributed to the *Journal*[1] by Mr. E. H. Godfrey, of the Canadian Department of Agriculture, entitled "Methods of Crop Reporting in Different Countries." In that Paper the author described the different systems in use in different countries in preparing statements of the condition of the principal crops during growth and forecasts of their yields. Broadly speaking the different systems may be divided into two classes: one, the "descriptive class," comprising those systems in which words which possess no definite quantitative value are used to describe the prospects of crops; the other, the "numerical class," comprising those systems in which quantitative estimates are made of the probable yield of the crops. Each class contains a variety of methods, and the "descriptive" class includes several methods which at first sight might be considered quantitative but are really not so. It is not the purpose of the present Paper, however, to enter on any discussion of the merits of the "numerical" as compared with the "descriptive" systems. It may be enough to mention that the method of crop reporting adopted by the International Agricultural Institute for the purpose of their monthly statistical service is the same numerical method as was adopted by the Board of Agriculture and Fisheries of Great Britain when the service of reports on crop prospects was established in 1906. In this method the reports express the probable yield of the crop as a percentage of the average yield of the preceding ten years; thus, if the prospects for wheat are expressed by the figure 102, it is signified that, judging from appearances at the date of the report, the yield of wheat is likely to be 2 per cent. in excess of the average yield of the last ten years. At the request of the International Agricultural Institute the same method has been adopted by some countries which previously possessed no crop reporting service. In an article appearing in *The Times* of April 24 last, the Rome correspondent of that journal states that the efficiency of the "numerical" system (or "estimates" system as it is there termed) had been challenged by the advocates of the "descriptive" system (system of "classification") which was followed by some leading European countries, and the matter would be brought up for discussion at the meeting of the General Assembly of the Institute held at Rome during the present month.

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[1] *Journal of Royal Statistical Society*, March, 1910, p. 257.

In the present Paper, however, I propose to direct attention to the numerical method which has been in use for many years in the United States, and was, in 1908, adopted by the Canadian Department of Agriculture also. The method is also represented in Great Britain in the reports which have for many years appeared in *The Times* on the condition and prospects of the crops of Great Britain. By this method the condition and prospects as to yield of a crop are numerically expressed in the form of a percentage of what is described as a "full normal" crop (in the United States), a "standard" crop (in Canada), or a "normal" crop (in *The Times*).

Definitions of a normal crop.

The *Crop Reporter*, published by the United States Department of Agriculture, contains[2] a definition of what should be understood as a "full normal" crop, and I therefore quote it fully, as follows (the italics are as in the original article):—

"To begin with, a full normal condition is *not* an *average* condition, but a condition *above* the average, giving promise of *more than an average crop.*

"Furthermore, a full normal condition does not indicate a *perfect* crop, or a crop that is or promises to be the very largest in quantity and the very best in quality that the region reported upon may be considered capable of producing. The full normal indicates something less than this, and thus comes between the average and the possible maximum, being greater than the former and less than the latter.

"The full normal condition may be described as a condition of perfect healthfulness, unimpaired by drought, hail, insects or other

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[2] *Crop Reporter*, December, 1908, p. 97.

" injurious agency, and with such growth and development as may " reasonably be looked for under those favourable conditions. As " stated in the instructions to correspondents, it *does not* represent a " crop of extraordinary character such as may be produced here and " there by the special effort of some highly skilled farmer with " abundant means, or such as may be grown on a bit of land of " extraordinary fertility, or even such as may be grown quite " extensively once in a dozen years in a season that is extraordi- " narily favourable to the crop to be raised. A full normal crop " in short, is neither deficient on the one hand nor extraordinarily " heavy on the other. While the full normal condition is but rarely " reported for the entire corn, wheat, cotton or other crop area, at " the same time or in the same year, its local occurrence is by no " means uncommon, and whenever it is found to exist it should be " indicated by the number 100 . . . .

" . . . . The full normal not being everywhere the same, in " determining how near the condition of any given crop is to it, " correspondents will usually find it an advantage to have a definite " idea of what yield per acre would constitute a full normal crop " in their respective districts—that is, how many bushels, pounds or " tons per acre of a particular crop would be produced in a season " that was distinctly but not exceptionally favourable. In a region " where 30 bushels of corn may be taken as the full normal yield, a " condition of 90 would give a prospect of a crop of 27 bushels, and " 80 a crop of 24 bushels . . . .

" . . . . For the reason that the full normal represented by 100 " does not indicate a perfect or the largest possible crop, it may " occasionally be exceeded. The condition may be so exceptionally " favourable as to promise a crop that will exceed the full normal, " and it will accordingly have to be expressed by 105, 110 or " whatever other figures may seem warranted by the facts—105 " representing 5 per cent. above the full normal; 110, 10 per cent., " and so forth."

The definitions of a "standard" crop published by the Canadian Department, and of a "normal" crop published by *The Times* are not so ample, but express an idea very similar to that of the American Department. Thus the *Census and Statistics Monthly*,[3] published by the Dominion Department of Agriculture, states:—"As regards " condition, correspondents were instructed to make the basis of " comparison that of a standard, which as applied to crops, means " the condition for a full crop, and as applied to live stock means a " healthy and thrifty state. In each case 100 represents a standard

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[3] *Census and Statistics Monthly*, July, 1908.

"condition, and any number above or below 100 will show a condition better than or not as good as a standard." It is interesting to find the condition of stock being expressed in a numerical form, but it is surely difficult to imagine what was the state of milch cows which, in July, 1908, were reported as being 6 per cent. below standard condition, or of sheep which were 17 per cent. below standard condition.

The Times[4] describes a normal crop as a crop "of perfect "healthiness and exemption from injury (due to insect or fungus "pests, drought or wet, cold or frost), with average growth and "development for the time of year."

It is clear, therefore, from the above definitions, that a normal crop has no definite statistical basis, but must vary in the judgment of individual correspondents. Even if they assign a definite value in bushels or tons to the normal crop, their estimate is very likely to be affected in one direction or the other by the degree in which one part of such a definition as that quoted above from the *Crop Reporter* may have impressed itself on their mind more than some other part.

Estimates of normal condition and promise for the decade 1899-1908.

In the following table the average condition of the more important crops of the United States, expressed as a percentage of the normal, is given for each month, from April to October, so far as reports are published:—

Table I.

[Ten years, 1899-1908.]

Crops.	April.	May.	June.	July.	August.	September.	October.
Corn (maize)	—	—	—	84·8	82·6	80·6	79·2
Winter wheat ...	86·6	86·0	80·5	79·6	—	—	—
Spring ,, ...	—	—	92·6	87·0	81·1	77·0	—
Oats	—	—	88·4	86·8	83·1	79·8	—
Barley	—	—	90·6	88·3	86·1	83·7	—
Rye	89·2	89·1	89·4	89·8	87·9	—	—
Buckwheat	—	—	—	—	91·7	86·4	82·4
Potatoes	—	—	—	91·0	86·7	80·4	75·9
Rice	—	—	—	89·3	90·0	88·7	87·1
Hay	—	89·5	86·5	84·0	87·7	—	—
Tobacco	—	—	—	85·7	82·3	82·7	83·1
Cotton	—	—	81·4	80·8	80·6	73·6	67·0

A point of interest in connection with this table is that, to a certain extent, the figures may be regarded as giving the average life-history (or life-table) of each crop for the ten years 1899-1908. Of the twelve crops, eight deteriorated steadily from the commencement, the process being most marked in the cases of spring wheat, potatoes, and cotton, and least so for maize. Four crops, rye, rice, hay, and tobacco, improved in relation to the normal during the later months of the season.

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[4] *The Times*, August 11, 1908.

The next table gives similar particulars for six crops in Great Britain, extracted from the reports published in *The Times*. The figures represent the average condition of the crops, expressed as a percentage of the normal, during the decade 1899-1908.

TABLE II.

[Ten years, 1899-1908.]

Crop.	July.	August.	September.	October.
Wheat	90·93	92·50	92·00	91·70
Barley	88·55	90·66	90·14	89·00
Oats	88·06	88·84	88·90	89·31
Beans	91·75	89·32	88·00	87·17
Potatoes	89·89	90·34	88·60	85·86
Roots	87·24	87·39	87·31	86·32

From this table it appears that the corn crops and potatoes and roots improved during July during the decade 1899-1908, and oats improved a little more in August. Beans, however, steadily deteriorated after July 1.

I have not quoted the figures available for Canada, as the service of crop reports was only established there as recently as 1908, and consequently the "standard crop" hardly possesses a statistical history.

Difficulties in the interpretation of the system.

The most serious disadvantage of this system is that a "normal" crop has no statistical basis, and consequently the figures of a crop report, using percentages of the "normal" as its method of estimating, cannot by themselves convey a definite meaning. One requires to know whether a crop which is reported as, say, 95 per cent. of the "normal" is better than usual or worse than usual, and this need is recognised in the United States reports and in those of *The Times*, for both, when stating the condition of a crop in any month of 1909, gave also the average condition (quoted in the tables above) of the crop in the same month of the previous decade. Without such a comparison the reports would lose a great deal of their value, and this being so, there seems no reason why the method, wherein the probable yield of a crop is expressed as a percentage of the average yield of the previous ten years, should not be adopted at the outset, for it becomes necessary to revert to it in interpreting the reports.

It should be understood, in this connection, that a ten-year average is not necessarily the most useful average to adopt in all countries. In those countries, such as Canada, Argentina, and Asiatic Russia, where the area under crops is rapidly expanding year by year, there is for large tracts of land no ten-year average available, and the averages of smaller periods are a necessity if a useful comparison is to be made. In the Russian crop statistics (not crop forecasts) a five-year average is actually taken as a standard for comparison. In Great Britain a ten-year average was adopted when the official system of annual estimates of the produce of the crops was started in 1884, and its use in crop forecasts in 1906 was thus an extension of the existing practice.

There is also a pitfall awaiting the unwary in interpreting the "normal" system, which may best be explained by a concrete example. On July 1 the condition of wheat may be stated as 90 per cent. of the normal, the ten-year average being 88 per cent.; on August 1 the condition becomes 89 per cent. Does this mean that wheat is in a less satisfactory position than at July 1? Yes, if the ten-year average for August 1 is still 88 per cent., because on July 1 wheat was 2·3 per cent. above the ten-year average condition, and at August 1 1·1 per cent. above. If, however, the ten-year average for August 1 was not 88 but 86, then the condition of wheat had really improved since July 1 to 3·5 per cent. above the ten-year average. This comparison with the ten-year average condition is an obvious matter for the expert, but perhaps the majority of those whom a crop report is intended to benefit might be caught in that trap.

The definitions of a normal crop also appear to aim at an attempt to describe both the quantity and quality of a crop by one numerical statement covering both. In proportion as this aim is adhered to, so is it more difficult to know exactly what interpretation is to be given to a percentage statement in terms of a normal crop; in practice, however, the idea of quality in the reports appears to recede more and more into the background, and the forecasts relate more and more exclusively to the yield as the season progresses. The American Department does, indeed, give a separate statement after harvest of the quality of crops, expressing it as a percentage of "normal quality." It seems to me arguable that in reports on crops in their earlier stages the degree of healthfulness must be allowed to influence estimates of the probable yield.

The value of a normal yield.

In the definition of a full normal crop in the United States, quoted above, it is stated that the correspondents of the Department of Agriculture would find it an advantage to have a definite idea of what yield per acre would constitute a full normal crop in their respective districts. To arrive at such an estimate appears in itself a matter of difficulty, and a matter upon which even the most competent reporters might honestly form differing opinions. Assuming, however, that the local correspondents have formed satisfactory estimates (though no absolute test of the estimates thus made exists), it is of interest to calculate what may be regarded as a normal yield for the United States as a whole, that is, the yield which might be expected if the conditions favourable to producing normal yields in individual districts occurred simultaneously, so that every district produced a normal crop in the same season. The average yield for the United States in such a season would be a full normal yield.

The data available for making the calculation of what were the normal yields of the crops during the ten years, 1899-1908, are (1) the ten-year average condition and promise of the crop immediately before or at harvest, expressed as a percentage of the normal, and (2) the estimated actual harvest yields (the average of 1899-1908 being taken). Table I gives the first data, the necessary percentages being those of the last month shown for each crop. The average yields of each crop for the decade 1899-1908 have been taken from the *Crop Reporter.* The value of the normal yield is approximately given by the following simple calculation :—

$$\text{Normal yield of decade} = \frac{\text{Average yield of decade}}{\begin{array}{c}\text{Average condition at harvest}\\ \text{during decade}\end{array}} \times 100.$$

Shortly after I first gave my attention to the subject of the normal crop the *Crop Reporter* appeared[5] with a short article estimating the value of a normal yield in the same manner. It is there pointed out that the calculation is approximate because a change sometimes occurs in a crop after the date of the last condition report and before harvest, and also because the data used are estimates and subject to errors of judgment.

It is to be noted that the American Department practically excludes from consideration the suggestion that their estimates of condition in terms of the normal make allowance for the quality as well as quantity of the crop.

The next table gives the average condition of the corn crops of the United States just prior to harvest during the ten years 1899-1908, the average yield of each crop for the same ten years, the estimated normal yield of each crop, the highest yield of each crop (1) in the decade (2) ever recorded, and finally the normal yield of each crop expressed as a percentage of the average yield.

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[5] *Crop Reporter*, December, 1909.

TABLE III.

[Ten years, 1899-1908.]

Crop.	Average condition before harvest.	Average yield at harvest.	**Estimated normal yield.**	Actual highest yield.		Normal yield as per cent. of average yield.
				1899-1908.	1866-1908.	
		Winchester bushels.	**Winchester bushels.**	Winchester bushels.	Winchester bushels.	
Corn (maize)	79·2	25·8	**32·6**	30·3 (1906)	30·8 (1872)	126
Winter wheat	79·6	13·9	**17·5**	15·5 ('06)	15·5 (1906)	126
Spring "	77·0	13·5	**17·5**			130
Oats	79·8	29·4	**36·8**	34·5 ('02)	34·5 ('02)	125
Barley	83·7	25·8	**30·8**	29·0 ('02)	29·0 ('02)	119
Rye	87·9	15·8	**18·1**	17·0 ('02)	17·0 ('02)	115
Buckwheat	82·4	18·0	**21·8**	19·8 ('08)	21·8 (1866)	121

It is at once clear that a normal yield is, from the point of view of the United States crop reporters, really much greater than an average yield, and, with the single exception of the buckwheat crop, the normal yield of each of the above corn crops also considerably exceeds the largest yield yet returned for that crop. The last column shows that a normal yield is from 15 to 30 per cent. higher than an average yield; on an average for the seven crops it is 23 per cent. higher. A corn crop which gave a yield 23 per cent. above the average yield of ten years would, in Great Britain, certainly be regarded as an extremely good crop, and it would occur but rarely even in favourable seasons. The normal yields in America do not, therefore, agree well with the definition of them which I have quoted above, wherein it was stated that a full normal crop "does "not represent a crop of extraordinary character, such as may "be produced here and there by the special effort of some highly "skilled farmer with abundant means, or such as may be grown on "a bit of land of extraordinary fertility, or even such as may be "grown quite extensively once in a dozen years in a season that is "extraordinarily favourable to the crop to be raised."

The next table, reproduced from the *Crop Reporter*,[6] gives the calculated value of the normal yields of the corn crops for the two decades, 1889-1898 and 1899-1908.

[6] *Crop Reporter*, December, 1909.

TABLE IV.

Crops.	Estimated normal yield.		Increase.
	1889-1898.	1899-1908.	
	Winchester bushels.	Winchester bushels.	Winchester bushels.
Corn (maize)	29·9	32·6	2·7
Winter wheat	15·9	17·5	1·6
Spring ,,	16·3	17·5	1·2
Oats	32·4	36·8	4·4
Barley	27·6	30·8	3·2
Rye	15·8	18·1	2·3
Buckwheat	19·7	21·8	2·1

For all the crops the value of a normal yield has increased, and the figures for the last five years of the second decade show that the improvement is continuing.

From *The Times* reports it is possible to calculate the hypothetical value of a normal yield in Great Britain. The following table gives, in the first place, the average condition of the three cereal crops on October 1 expressed as a percentage of the normal yield (100) in the ten years 1899-1908, and the normal yield expressed as a percentage of an average yield.

TABLE V.

[Ten years, 1899-1908.]

Crop.	Average condition on October 1 as per cent. of normal.	Normal yield as per cent. of average yield.
Wheat	91·70	109
Barley	89·00	112
Oats	89·31	112

The average excess of a normal yield over an average yield is 11 per cent., and in this respect *The Times* normal corn crop differs from the average by just one-half of the amount that a normal corn crop of the United States differs from an average crop.

The normal yield of a corn crop in Great Britain may be calculated by applying the percentages of the last table to the official average yield of each crop for the same ten years. The next table gives the normal yields as so calculated with the previous highest yields for purposes of comparison.

The highest actual barley yield shown in the table has since been surpassed by that of 1909, 36·61 bushels per acre. The normal yields shown for Great Britain are higher for barley and oats than the highest actually recorded for any year since produce returns have been collected; but the normal yield of wheat is nearly half a bushel less than what was actually returned for 1898.

TABLE VI.

[Ten years, 1899-1908.]

Crop.	Official average yield.	**Estimated normal yield.**	Highest actual yield.	
			1899-1908.	1885-1908.
	Imperial bushels.	**Imperial bushels.**	Imperial bushels.	Imperial bushels.
Wheat	31·46	**34·31**	33·96 (1907)	34·74 (1898)
Barley	33·09	**37·19**	35·26 (,,)	35·75 (,,)
Oats	39·65	**44·40**	43·04 (,,)	43·04 (1907)

Summary of conclusions.

The points which appear to me to be brought out most clearly by the examination of the method by which a normal crop is used as a standard for crop reporting purposes may be summarised briefly as follows:—

(1.) The normal crop as at present defined has no basis in statistical experience, and being a crop which, from the definition, can only be produced in unusual seasons, must largely be constructed in the imagination of the individual reporter.

(2.) Analysis of the results obtained by the method shows that, in practice, normal yields exceed the highest yields yet recorded and so contradict the definitions establishing them; but this criticism applies most markedly to the normal yields of the United States.

(3.) As the normal crop is without a statistical basis, a simple statement of the condition of a crop at a given date in terms of the normal does not convey, by itself, a definite idea of the favourableness or unfavourableness of the prospects for the yield of that crop.

(4.) In order to present the idea referred to in conclusion (3) to those for whom the reports are intended, statisticians using the method have found it necessary, for comparison, to state the average condition of the crop at the given date during the ten preceding years. The decennial average condition varies, however, from month to month of the season, and so a further complication appears in the reports, causing difficulties in interpretation.

(5.) The difficulties mentioned in conclusions (3) and (4) would be at once obviated by expressing the probable yield of a crop as a percentage of the average yield (taken as 100) of that crop during some convenient preceding period.

DISCUSSION *on* MR. VIGOR'S PAPER.

MR. C. P. SANGER said it gave him very great pleasure, both on personal grounds and because of the very excellent character of the Paper, to propose a vote of thanks to Mr. Vigor. The Paper illustrated in a most admirable way the great importance, when dealing with figures, of ascertaining what those figures meant, and seeing, further, whether they meant anything. He thought it might be said with some truth that the official figures of the United States and those given in *The Times* about "normal" crops did not mean anything: that was to say, in order to attach any meaning to them they had to be expressed in percentages of other figures. It would be very interesting to find the reason why those who were responsible for the collection of statistics should adopt methods which produced statistics very difficult to interpret, if indeed they could be interpreted. Further, in the United States figures an elaborate definition was given of a "full normal" crop, and it was then found that the statistics published contradicted that definition; he could not see why they should use that method nor why some other method should not be used. He supposed the farmer would not like to be told that his crop was above the average; the farmer would probably prefer to be told in all years that his crop was below the average. That statement might also bring about to the farmer a slight direct benefit inasmuch as if the crop prospects did not look favourable that fact might bring about slightly improved prices. The "bulls" would no doubt on the whole prefer the crop reports not to be too favourable, but why the "bulls" should be more powerful than the "bears" was a matter which might be further investigated. There was one point which it would be interesting for the author of the Paper to investigate further. These crop reports referred to "normal" conditions over a large area, but with different areas they got different figures and he would wish that the author would work out the proportions in which "normal" crops could be obtained over large areas such as existed in the United States. With regard to the United States, he did not know what areas were dealt with by the various correspondents, and it would be an advantage to work out some sort of table which would show how the different areas were distributed, indicating so many per cent. "full normal" and so many of different percentages below "full normal." He would like to know whether such a table would create the sort of curve one would expect—no doubt Mr. Yule would be able to fit a formula to that curve whatever it was. If that investigation were made it might, and no doubt would, throw some light on the psychology of correspondents in different parts of the world. It would also enable one to get a better idea of what was meant by "normal." In speaking of "normal" and averages they were in this difficulty, that a "normal" was not an average. Here they were not dealing with averages but with normals, and that brought about a very complicated state of affairs. From the point of view of criticism he had only to say that the Paper seemed to be an excellent piece of work, and he hoped that other young Fellows of the Society would spend their time in producing short papers which would be as valuable as he was sure this would prove to be.

Mr. SYDNEY YOUNG, in seconding the vote of thanks, said it was most opportune that Mr. Vigor should have read this Paper in view of the general assembly of the International Agricultural Institute to be held next week. He had given a very fine definition of what "normal" meant, and if anybody could understand what it meant when they had read the Paper through he would be glad to be apprised of it. He could not understand it at all himself, and that was why he could never understand the American statistics with regard to crops. He could never understand why they went up so much at one time and down at another without any apparent reason, as it seemed to him; and, indeed, at the end of the crop season it was often found that all the American statistics were wrong. Mr. Sanger had said that he thought the "bulls" were most favourable to America, but if they went to the American market he thought they would find that, as a general rule, it was mostly affected by the "bears." There had been a "bear" market for a very long time, and it was the "bears" who were spoiling the market at the present moment.

Mr. R. H. HOOKER expressed his gratitude to Mr. Vigor for bringing this subject before them. The International Agricultural Institute had hitherto adopted the system advocated here, and it would be a great pity if they abandoned it. Mr. Vigor had not laid very much stress upon the point that the figure 100 representing "normal" was not purely a figure representative of quantity, but also took account of conditions. This offered a further trap into which even the authorities responsible for the estimates sometimes fell, as they occasionally made calculations of the probable yield indicated by their figures, and in so doing sometimes took the percentage as representing quantity only. He had himself very great difficulty in understanding what was meant by a percentage of condition. A percentage was a figure, and when they talked of a percentage they meant that something could be measured and divided into one hundred parts from zero up to 100. In that case a percentage of 90, say, represented a definite point on a well defined scale; but it was a very different matter when the thing was not subject to measurement. In the case of Canada, for instance, which published a numerical estimate of the condition of live stock, what was the "zero" condition—was the animal dead? If the condition of a cow were represented by 90, would this mean that it was nine-tenths on the way to the grave? There was an interesting point in the comparison of the tables for the United States and *The Times*, showing the "average" condition in ten years. In the United States the average condition of a crop generally declined steadily throughout the period, and that was perfectly natural. In the spring a crop would, on the average, be more nearly normal, but as the season went on it was liable to insect attacks, droughts, &c., and therefore condition would depreciate gradually from "perfect healthfulness" throughout the season. Now and then a month would be exceptionally favourable and there might be a rise in the percentage, but the tendency should be for condition to decline during the season; because "normal" being by definition above an average, it followed that if they had only an average month progress was less than normal, and, on the ten years' mean, the numerical estimate should show a falling-off. In *The Times* reports, on the other hand, the average condition seemed just as likely to improve as not, and such a feature could only mean that the averages had been put too low at the beginning of the season, *i.e.*, that early forecasts were, on the average, pessimistic. With regard to Mr. Vigor's second conclusion, he did not think the author was correct in saying that the fact of normal yields in practice exceeding the highest yields yet recorded was necessarily contradictory of the definitions. This might, and did, occur in single districts, and that seemed to be in accordance with the definitions. He congratulated Mr. Vigor on a very useful piece of work, which should be of great value to the International Agricultural Institute.

Mr. C. KAINS-JACKSON thought the Society should express their gratitude to Mr. Vigor for writing on these subjects. They had been told that during the last ten years or more the word "normal" had been used by statistical bodies, but these bodies found that it was not a very good description, so that some now used the phrase "ideal" in place of "normal" or "full normal." That word in turn of course was open to a grave objection, although it was better understood than "normal." What he would venture to suggest as a desirable course for a statistical body was, not to dispense with these "normal" figures in favour of average figures, but to have two sets of figures instead of only the normal, the second being an average based on the total number of years that statistical returns had been taken, the average being also taken for a comparatively short period like ten years. He thought the Board of Agriculture was greatly to be congratulated upon taking a decennial average, because nothing worked out more clearly than that there was a change in these decennial periods of averages. In the last report of the Board of Agriculture, in which the figures for twenty years were presented, this was brought out in a most instructive and interesting manner. The second point he would like to urge was that they should have an average taken twice a year—roughly speaking, in November and in April or May. They should take estimates after threshings as the ultimate average, and if the Institute at Rome were able to induce all countries to agree upon that, the concensus of power would be so great that newspaper men and other people who pressed for early statistics at any price could be kept a little in check. That, he thought, was needed, because each "progressive" country at present tried to hurry statistics upon the public before the most vigilant official could fully digest them. While appreciating the sarcasms of the last speaker on certain livestock statistics, he ventured to disagree with him. He thought if the authorities would adopt averages for live stock they would be most valuable, as putting into the concrete form of figures notes which were not mere passing reports. For instance, at the present moment he found that most farmers were agreed that this was an exceptionally good May, not only for the flow of milk, but for richness in butter fat. On the other hand, although the lambs were healthy, the births of twins had been less than usual. Yearly records of the births of foals would prove most interesting. As to all these things, agriculturists at present had no permanent record, and he hoped that statisticians would try to do something by way of showing how much could be accomplished in this direction. Even simple current talk, when amounting to a concensus of opinion, would give on a period of years working percentages sufficiently just to be a useful guide.

Mr. VIGOR said there was perhaps only one criticism of the Paper which required a reply. Mr. Hooker had differed somewhat from his conclusion No. 2. Mr. Hooker said he did not think that the fact that the estimated normal crop exceeded the recorded maximum crops in the United States, and in most cases given in *The Times* reports, could be taken as a contradiction of the definition. The definition was certainly not absolutely conclusive on this point, but it made this statement: "While the full normal condition is but rarely reported for the entire corn, wheat, cotton or other crop area, at the same time or in the same year, its local occurrence is by no means uncommon." It was there suggested that it was possible for a normal yield to occur over the entire crop area, though rarely; the definition did not exclude the possibility that it might occur. With regard to the suggestion of Mr. Kains-Jackson, that it was useful to have two numerical systems, the official system and the "normal" system employed side by side, he (the speaker) mentioned as an instance of the misconception which would result, that once last season (1910) the *Scotsman* published the official figures giving the condition of crops in terms of the average (taken as 100), and in a neighbouring column gave *The Times* reports of the condition of crops in terms of the "normal." The official figures ranged round 100, but *The Times* reports gave figures below 100—ranging round 90. The Press writer had quite failed to understand the difference between the two systems, and as a result he said the reports were contradictory; though they were not necessarily so. The effect of the two sets of figures being published in the Press thus led to misconception on the part of writers, and consequently also on the part of farmers reading them. He thanked the Society for the vote of thanks which had been accorded.

SEASONAL FLUCTUATIONS *in* EMPLOYMENT *in the* GAS INDUSTRY.

By FRANK POPPLEWELL, B.Sc.

[Read before the Royal Statistical Society, May 16, 1911, the President, the Right Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.]

THE present Paper embodies the preliminary results of an inquiry into seasonal fluctuations in employment in the gas industry. The main points to be investigated in the inquiry were: the extent of seasonal irregularity in employment in gas works; the volume of actual unemployment among gas workers during the slack season, and the extent to which the gas industry dovetails into other seasonal trades; and the changes now taking place which are tending to modify the effects of the seasonality of this industry.

Seasonal irregularity in gas production.

It may be stated at the outset that gas production synchronises with gas consumption, so that in point of period the two terms are interchangeable. Production in works with the largest storage capacity is rarely, if ever, twenty-four hours ahead of consumption. The two curves lie similarly one above the other at a distance determined by the combined quantity of gas lost in distribution and used in gas works in the manufacture of gas itself.

The predominant factor determining the consumption of gas is found in the relative amounts of light and darkness in the twenty-four hours. We find accordingly that the rate of consumption through the year is represented by a smooth and nearly symmetrical curve whose highest point occurs at the end of December and whose lowest point occurs at the end of June. We should expect to find the curvature greatest in the north of Scotland and least in the south of England because the nights are longer in winter and shorter in summer in Scotland than in England. The extent of the variation between these latitudes I have not determined, but it is not very material to the inquiry. It may be noted in passing that the effect of a daylight-saving scheme would be to steepen this curve and so aggravate the evil of seasonal fluctuation in employment.

The difference in the production of gas between the busiest and slackest seasons of the year is illustrated by the following figures relating to individual works in different parts of the country:—

TABLE I.—*Production of gas at a gas works in the south of England in* 1910.

Week in	Cubic feet of gas made in week.	Percentage of June production.
June	23,888,000	100
December	38,484,000	161

TABLE II.—*Production of gas, and number of men employed, at a gas works in the north of England in* 1909.

Week in	Cubic feet of gas made in week.	Percentage of June production.	Number of men employed.	Percentage of June employment.
June	3,051,000	100	95	100
December	7,435,000	244	115	121

TABLE III.—*Production of gas, and number of men employed, at a gas works in the south of England in* 1910.

Week in	Cubic feet of gas made.	Percentage of June production.	Number of men employed.	Percentage of June employment.
June	27,334,000	100	5,461	100
December	51,760,000	189	6,480	119

Climatic conditions are not the sole factors determining the consumption of gas, hence the difference between Tables I and III in the matter of percentage increase in production in December. I shall return to a consideration of this point later. Although the effect of climatic conditions cannot be stated separately from the other factors at work, the influence of latitude is shown by the greater percentage variation in the case of the works in the North of England than in the case of the two works in the South of England.

Tables II and III illustrate a further important point, viz., that the variation in numbers employed is considerably less than that in quantity of gas made. It is largely a coincidence that Tables II and III practically agree in this respect, because fluctuation in employment is subject to so many more variations than that in production. The relation between persons employed and gas made will be dealt with fully in a later part of the paper.

No information is available as to the average seasonal variation in production for the whole industry. This, fortunately, is of little consequence, since the seasonal variation in employment itself has been exactly measured over a large part of the industry.

Seasonal variation in employment.

Seasonal variation in employment at gas works is shown by the following table giving the total number of workpeople paid wages in the last pay-week in each month of 1906 by the local authorities and companies furnishing returns to the Board of Trade for the purpose of the Earnings and Hours Inquiry.

TABLE IV.—*United Kingdom.*

Month.	Workpeople.	Percentage of average weekly number.
January	69,863	108·2
February	67,510	104·5
March	64,085	99·2
April	61,507	95·2
May	60,500	93·7
June	59,691	92·4
July	60,033	93·0
August	60,647	93·9
September	63,130	97·7
October	66,304	102·7
November	69,880	108·2
December	71,854	111·3
Average weekly number	64,584	100·0

The limits of the variation in employment among the persons covered by this Return are thus seen to lie between 92·4 per cent. and 111·3 per cent. of the average number employed in the year.

"No statistics are available," states the Report on this Inquiry, "comparable with the figures given . . . . as to the total "number of persons engaged in these services. As, however, "Returns were received from nearly all the local authorities directly "employing labour, and from most of the private companies of importance, the information obtained covers a very large proportion "of the total number employed . . . . and the results presented may therefore be regarded as resting on a thoroughly "representative basis."

It is unfortunate for the present inquiry that the total number of persons employed in connection with the service of gas-supply cannot be accurately ascertained, because the number of men concerned is of the essence of the matter in studying a problem of unemployment, especially in relation to the possibility of dovetailing between various seasonal industries. I have examined the material available to see to what extent an approximation may be arrived at.

The two sources of information are the statistics of the occupational census for the British Isles in 1901, and the triennial returns of persons employed in factories and workshops published by the

Factory Department of the Home Office. The occupational census of 1901 shows 54,110 persons as engaged in connection with gas works service. The details of occupation included under this head show gasman, fireman, stoker, scoop-driver, retort-labourer, purifier, coke-filler, service-layer, pipe-layer, meter-inspector, lamplighter, lamp-cleaner, valveman, coal-porter (if working in gas works). Of 68,234 persons employed in an ordinary winter week of 1906 as shown by the Earnings and Hours Inquiry, 50,235 were engaged in the occupations enumerated above. The large number of general yard labourers, and carmen and carters, and undefined workers employed in gas works are included under other categories in the occupational census. Applying the proportion arrived at from the Earnings and Hours Inquiry to the 54,110 engaged in gas-works service as shown in the occupational census we obtain the figure of 73,500 (in round numbers) as the total number employed in the industry in 1901. This number is too low because the proportion of men engaged in the occupations specified is greater in an ordinary winter week than it would be in April when the census was taken. 73,500 therefore represents a minimum. There is no means of correctly estimating the increase in the numbers employed between 1901 and 1906.

The Home Office figures are still less satisfactory for our purpose. The numbers employed in non-textile factories in 1907 under the heading "Gas" is shown as 62,234. Returns were received from 1,328 establishments; returns relating to 73 establishments, probably the new and smaller ones, were outstanding. The figure relates presumably to the average number employed during the year, and falls short therefore of the number for an ordinary winter week by about 9·2 per cent. It relates, again, presumably to the men employed wholly or partly in the gas works and not to those engaged exclusively outside. The former class comprise 54,891 out of the 68,234 shown in the Earnings and Hours Enquiry. Applying corrections for these two variations we get 77,500 as the average total number employed in 1907, or 84,600 as the total number for an ordinary winter week of 1907. This latter number is too small by reason both of the outstanding Returns, and of the extent, if any, to which occupiers of gas factories may have returned such classes of labour as mechanics, carpenters, gas-fitters, etc., under headings other than "gas."

I hesitate before a Statistical Society to suggest any conclusion from these figures as to the maximum number of persons employed in connection with the service of gas supply in 1906 or 1907. The average number for 1907 probably does not very much exceed 80,000. My object in making this examination of the material was as much to show the unsatisfactory nature of statistics of occupation as to try and get a rough notion of the size of the gas industry.

Returning to the figures in Table IV, and taking the number of men employed at gas works in the slackest week in the year as 100, it is seen that the number employed in the busiest week is 120·4. This variation of 20·4 per cent. is not, however, a full measure of the effect due to season alone. It is less than it would otherwise be by the extent to which the industry was expanding during the twelve months under consideration. That is to say, the highest and lowest points in the curve over a series of years do not lie on parallel horizontal lines, but are driven upwards in each successive half year by the pressure of the expansion in production.

If the growth in the production and consumption of gas were perfectly regular from year to year, the effect of such growth in reducing the seasonal variation would be a matter of theoretical interest only. The year 1906, however, was a year of exceptional expansion in the gas industry.

TABLE V.

Year.*	Gas sold by authorised gas undertakings in thousands of cubic feet.	Increase on previous year.	Percentage increase on previous year.
1909	177,687	3,730	2·1
'08	173,957	1,068	0·6
'07	172,889	4,944	2·9
'06	167,945	6,537	4·0
'05	161,408	5,828	3·7
'04	155,580	3,902	2·6
'03	151,678	3,945	2·7
'02	147,733	3,674	2·6
'01	144,059	3,640	2·6
'00	140,418	4,697	3·5
1899	135,722	—	—

* The returns relating to local authorities are for the twelve months period ending March 31 in the following year. The returns relating to gas undertakings other than those of local authorities are for the calendar year.

In a year of slight expansion, such as 1908, the modification in the seasonal variation produced by growth in the industry would be correspondingly lessened, and the variation in employment increased. As the number of men employed is not in direct proportion to the quantity of gas made, the modification we are discussing is incapable of exact measurement.

I must digress for a moment at this point to give an account, as brief and non-technical as may be consistent with intelligibility, of the organisation of the work in and about a gas-plant.

Coal gas is made by heating coal out of contact with air in long fireclay ovens or retorts until it ceases to lose in weight. The gaseous products of this distillation are led off by a pipe at each end of the retort, and the coke remaining at the end of the process, which usually occupies six hours, is drawn out of the retort while still red hot. Water is thrown on it, and when cool it is removed and stacked for sale.

The crude gas contains various impurities which have to be removed before it can be sent to the gasholders ready for distribution. To relieve it of these, the gas is passed first through long cooling pipes where tar and ammonia-liquor condense, thence into "scrubbers" where further impurities are removed by a washing process, and finally through a series of chambers containing various chemicals which effect the final purification of the gas. From these the gas passes into the large gasholders prior to distribution through the mains. The tar and ammonia-liquor are either sold from the gas works in their crude state, or else they are worked up into a variety of valuable chemical "by-products."

Another variety of illuminating gas is made in certain gas works for admixture with coal gas properly so-called. "Water-gas" is produced by blowing steam through red-hot coke in large "generators." "Blue" water-gas, as the first product is called, is non-luminous, and requires to be "carburetted" by passing it through the vapour of oil or spirit to give it illuminating power. The impurities in carburetted water-gas are essentially the same as those in coal gas, and similar methods of purification are adopted.

The actual work of gas production is carried out in the portion of the works known as the retort-house, and the men employed in connection therewith—known comprehensively as "Retort-House Men"—comprise coal-porters, coal-wheelers, coke-spreaders and wheelers, firemen, stokers, retort-cleaners, pipe-cleaners, retort-labourers and coal-trimmers. A second category of gas-works operatives includes in addition to the purifier and by-product men and the engine drivers and boiler attendants, tradesmen like platers, riveters, smiths, hammermen, bricklayers and retort setters, carpenters and joiners, painters and fitters, and also stove-repairers, coke-fillers, and a host of general labourers. These are known comprehensively as "yard men," and are engaged in and about the works in connection with purification and the manufacture of by-products and the repair and upkeep of the plant. There are, finally, the men employed exclusively in connection with the distributive side of the business, and working for the most part outside the works. In this class we have the gas-fitters, service-layers, main-layers, main-layers' labourers, meter-inspectors, meter-repairers, automatic meter rent-collectors, carmen and carters, lamplighters and a certain number of general labourers. It will be convenient to refer to this class as "outside men."

The carbonising process is continuous and goes on day and night, week-day and Sunday, without intermission. The men employed in connection with the manufacture and purification therefore "work in shifts or relays which relieve each other at "regular intervals and so provide for the continuous manning of the "retorts and engines. The older system of working divided the "day into two twelve-hour shifts, but three eight-hour shifts are "now the commoner practice."[1]

In estimating the effects of a seasonal trade, it is not sufficient to measure the extent of variation in employment. We require to know something of the incidence of the unemployment upon individuals. For example, we should not be justified in saying on the basis of the figures in Table IV that 59,691 actual individuals were given constant employment at gas works throughout 1906, that other so many actual individuals were employed continuously for eleven months, other so many for ten months, and so on. It is necessary to analyse the figures in Table V and see how they are made up.

The returns under the Wages and Hours Inquiry relate to the whole of the employees of gas undertakings, including those engaged in distribution as well as those engaged in the actual manufacture of gas.

Of the 68,234 men and boys employed in an ordinary winter week of 1906 by the companies and local authorities furnishing Returns for the purpose of the Earnings and Hours Inquiry, 23,417, or 34·3 per cent., were "retort-house men," 23,438, or 34·3 per cent. "yardmen," and 14,133, or 20·7 per cent. "outside men," while 7,246, or 10·6 per cent. were undefined.

The proportions depend, as we shall see later, upon the particular week which may have been selected for making the Return; they give, however, a sufficiently accurate idea of the distribution of the work in the industry generally over the three classes of labour defined above.

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[1] These are the nominal lengths of shift. In actual practice they are shorter. On the twelve-hour system the men charge a set of retorts every two hours, but the actual work occupies only about an hour, and in the last charge of the shift the men hurry themselves, and get it finished in three-quarters of an hour. They are then at liberty to go, and the men on the new shift only come in when the charge is ready to withdraw. There is thus an interval of an hour and a quarter between the shifts, and the actual length of shift is 10¾ hours. On the eight-hour system, charging takes place every hour, and occupies half an hour. The actual length of shift is, in this case, 7½ hours.

If the variation in employment of these different classes is analysed, striking differences at once become manifest. No official statistics are available bearing upon this point and I shall have to fall back largely upon information kindly furnished to me by the engineers of various local authorities and private companies.

TABLE VI.—*Number of men of each class employed at a gas works in June and December, respectively, in* 1910.

Class of labour.	June 24.	December 23.	Percentage increase or decrease on June.
Retort-house men	1,059	1,547	+ 46·1
Yardmen other than mechanics and fitters	1,498	1,453	– 3·0
Mechanics and fitters	717	732	+ 2·1
Other men	2,187	2,748	+ 25·7
Total	5,461	6,480	+ 18·7
Make of gas (in cubic feet)	27,334,000	51,760,000	+ 89·3

TABLE VII.—*Number of men of each class employed at a gas works in June and in December*, 1909.

Class of labour.	June.	December.	Percentage increase or decrease on June.
Retort-house men	15	43	+ 186·6
Yardmen	56	48	– 14·3
Outside men	24	24	0
Total	95	115	+ 21·1
Make of gas (in cubic feet)	3,051,000	7,435,000	+ 143·7

The next table shows how the fluctuation in employment among shiftmen and yardmen is spread over the year. Outside men are not included, but were stated in this case to be practically constant in number throughout the year.

TABLE VIII.—*Number of men employed in last week in each month of* 1909.

Month.	Shiftmen.	Percentage of number employed in June.	Yardmen.	Percentage of number employed in June.	Total.	Percentage of number employed in June.
January	306	160·2	344	93·2	650	116·1
February	295	154·4	338	91·6	633	113·0
March	280	146·6	338	91·6	618	110·3
April	208	108·9	352	95·3	560	100·0
May	189	98·9	367	99·4	556	99·3
June	191*	100·0	369	100·0	560	100·0
July	185	96·8	378	102·4	563	100·5
August	218	114·1	377	102·1	595	106·2
September	236	123·5	363	98·3	599	106·9
October	279	146·0	373	101·0	652	116·4
November	328	171·7	370	100·2	698	124·6
December	338	177·0	394	106·8	732	130·7

* The reason for the increase shown in June is that a number of shiftmen away on holiday were paid when absent, and were therefore carried on the books.

The causes for the differences between the various classes of labour in the matter of seasonal fluctuation are not far to seek. The number of shiftmen is regulated entirely by the production of gas. This, as we have seen, synchronises with consumption. The curve of employment of retort-house men therefore follows that of rate of consumption, but, as the figures quoted show, at a less steep inclination. The yardmen, on the other hand, including the fitters, mechanics, bricklayers, retort setters, &c., find their opportunity for greatest work when the carbonising plant is working at a minimum. The summer months are utilised as far as possible for the renewal of broken retorts, the overhauling of purifiers and by-product plant, and for effecting any necessary extensions to the works.

Before going on to discuss the fluctuations among each class of labour, I wish to give just one other set of figures (Table IX) illustrating the extent of the variation among each class of worker in the carbonising department.

The fluctuation in employment, which for the industry generally has a maximum of 20·4 per cent. calculated on the number employed in the slackest season of the year, is thus seen to be concentrated largely upon the retort-house men. Outside-men in some cases increase in winter, in others remain constant. Among yardmen there is a slight seasonal fluctuation *in the opposite sense to that among retort-house men.*

TABLE IX.—*Number of men employed in carbonising department in June and in December*, 1910.

Labour.	June.	December.	Percentage increase on June.
Stokers	15	21	40
Machine men	6	12	100
Firemen	8	18	125
Barrow men	—	5	—
Retort-house labourers	8	12	50
Coke conveyor men	6	4	− 33
Engine drivers	2	4	100
Boiler men	5	5	—
Coal wheelers	4	7	75
Total	54	88	63
Gas made (in cubic feet)	23,888,000	38,484,000	61

No figures are available from which the percentage maximum fluctuation among each class can be calculated. Its extent varies from works to works in accordance with variations in type of plant, character of consumption, and other conditions, as the figures in Tables VI-IX sufficiently show. These are given merely as types. The results of no one of them, nor yet of the average of the four, can be applied to the whole industry. All that can be said is that the 23,438 yardmen employed in a winter week in 1906 would increase by some few per cent. in the subsequent six months to a maximum about June; that the 14,133 outside men (and probably also the 7,246 "undefined" men) would decrease by some few per cent. in the same period; while the difference of 12,163 in the numbers for June and December would occur almost entirely among the 23,417 retort-house men, thus halving them.

It is now necessary to see how the fluctuations among the men in each class are organised, and the nature of the incidence of short-time employment upon individuals.

With regard to yardmen, employment with them is, as has been said, busiest in summer. Repairs and renewals of retorts, the overhauling of the machinery and engines, the carrying out of any new erection work are the jobs which occupy the skilled men among them—the mechanics, carpenters, bricklayers, &c.—during this period of the year. It is not, however, that the total yardwork is greater in summer than in winter, requiring a largely increased staff, but rather that more repairing work and less in other directions is done during the summer. The staff of tradesmen is increased very little if any as a result of the slight summer season. Mechanics, carpenters, bricklayers, have for the most part continuous employment in gas works, and any increase in their numbers is the result of the gradual expansion of the industry rather than a seasonal effect. The general yard-labourers on the other hand are subject to a slight seasonal increase in summer, as it is upon them that the extra work involved in painting the works, cleaning the purifiers, overhauling the sulphate-plant and the retort-house mainly falls. This increase is met in one of two ways. Either the extra men required are taken on from outside as "oddmen" on daily engagements, or else they are selected from among such stokers, firemen, &c., as would otherwise be discharged for the summer. In this latter case, it simply means that the retort-house man in question obtains a permanent instead of a temporary engagement.

In the case of the retort-house men, we have seen that there is permanent employment throughout the year for something more than half of them. The remainder are given engagements of from one to nine or ten months. The men taken on earliest in the autumn expansion are usually discharged last in the spring contraction, and similarly for the rest. The same individuals come back to a gas works year after year, and the incoming men are often given a few days yard work in order to collect a sufficient staff prior to setting a fresh battery of retorts in operation.

As has been said, a certain number of retort-house men are enabled to convert a part-time into a permanent engagement through the opportunity which occurs for extra employment in the yard during the summer. In some of the smaller works, where there exists a more personal tie between the gas manager and his men than in the larger concerns, the retort-house men receive first consideration, and yard labourers are turned away in summer to make room for stokers and firemen temporarily unemployed in carbonising. This is partly due to the desire of the gas manager not to lose his stokers, who are semi-skilled, and who in a small town would be much more likely to drift away altogether during the summer than would those in a large town with its more numerous opportunities of employment. The question of skill is not really important, since a green hand can be trained to stoking in a couple of weeks. But in the case of a large works the necessity for training any considerable number of new hands each autumn does not as a matter of fact occur, the old stokers re-appearing at about the same period in the autumn year after year.

The majority of the employees in the gas works service are thus seen to enjoy a considerable share of regularity in the matter of employment. Engagements for periods of less than three months' duration are rare, and this explains the possibility of applying profit-sharing and co-partnership schemes in an industry which, from its seasonal irregularity, appears at first sight to be the very last in which success might be expected in this direction. In 1909, 21 gas undertakings had in operation profit-sharing schemes in some form or another, and the minimum number of employees under profit-sharing or co-partnership agreements was 17,940. A full list of these concerns, with details of the agreements, is given in an appendix. The South Metropolitan Gas Company, which was the pioneer among gas companies in this movement, makes special arrangements whereby its six, five, four and three-monthly men are enabled to participate in the scheme.

An exception to this regularity in method of engagement and employment occurs, apparently only among the large works, in the case of the "odd men" to whom reference has been made. These men are attached to the carbonising department ready to take the place of any of the regular men who through illness or for any other reason fail to turn up at the usual time. They stand in a rank when the shifts are being made up at 6 a.m., 2 p.m. and 10 p.m. (or at the corresponding times in the case of two shifts) and take odd chances. If they get a shift's work they are paid for it at the end of the shift. They are purely casuals in that their engagements are short and intermittent and their selection determined largely by chance. The usual characteristic of a casual labour market is found in the constant attendance of a very much larger number of men than is required even on the busiest day. Of 6,127 men employed by a firm in December, 1904, 315 or 5 per cent. were odd men and the number in attendance on that day was stated to be twice or thrice that number. In the following June only 86 odd men out of a total of 5,148 were employed. This was due partly to the smaller number of men engaged in the retort-house in the summer, and partly, it was alleged, to the greater regularity among the permanent retort-house men than among the part-timers.

From the oddmen, where they exist, are recruited in part the more regular hands.

This casual class is fortunately disappearing with increased use of machinery in gas works, but it still flourishes at some of the larger works, and in summer is found to be made up largely of unemployed retort-house operatives.

The next point to determine is the extent, if any, to which regularisation of employment among shiftmen is affected by a change in the length of shift worked between winter and summer.

Of 23,121 shiftmen of whom particulars were furnished in connection with the Earnings and Hours Inquiry, 17,509 or 75·7 per cent. worked in shifts of eight hours, and 5,612 or 24·3 per cent. in shifts of twelve hours. The opportunity of shortening the length of the shift in the summer months, so as to spread the work over a larger number of men, and thus reduce irregularity in employment, exists therefore only in the case of firms employing less than a quarter of the total number of shiftmen employed.

The Report on the Earnings and Hours Inquiry makes no mention of firms working 12-hour shifts in winter and 8-hour shifts in summer, and as far as I can ascertain the practice is only followed in a single works.

Of the six works of the South Metropolitan Gas Co., three work 12-hour shifts throughout the year, two work 8-hour shifts throughout the year, and one works two shifts in winter and three shifts in summer. The question has been decided in each case by the men themselves. To the Company it is a matter of indifference which system prevails, since the cost remains the same. The men working on two shifts do only one-fifth more work per shift, and receive one-fifth more wages per shift than the three-shift men. Hence, while it lasts, the work is much more strenuous for the three-shift men, and this appears to be the chief argument against the shorter shift in places where it has not been adopted. The work of gas-stoking is extremely hot and exhausting even in winter; it is not altogether surprising that the men prefer not to increase their rate of work in the hotter months. In one works at least this consideration has led to a three-shift system being worked in winter and a two-shift system in summer, the men doing the same amount of work in both cases, but spreading it over a longer period in the hotter weather.

The summer employment of gas workers and the dovetailing of seasonal trades.

Taking the average number of persons employed in the gas industry as in round numbers 80,000, and assuming the fluctuation to be throughout the industry the same as that shown in the Earnings and Hours Inquiry of 1906, namely, from 92·4 per cent. of the average in the slackest month to 111·3 per cent. in the busiest, we arrive at the numbers of 73,920 and 89,040 as the maximum limits of the fluctuation, and at a total of 15,120 as the minimum number of men who are employed in connection with gas supply for periods of less than a complete year.

What happens to these men during the time they are not engaged at the gas works? What other classes of work are open to them or do they secure, and to what extent, if any, are they entirely or partly unemployed in the varying periods of their exclusion from the gas works?

The answer to this latter question, if it can be satisfactorily answered at all, must be purely qualitative. No statistics are available which would give even an approximate indication of the volume of unemployment resulting from the seasonal nature of the gas industry.

Of the three trade unions which include any considerable number of gas workers among their members, the largest, the National Union of Gasworkers and General Labourers, pays no unemployed, travelling, or emigration benefits of any kind. The next most important Union, the National Amalgamated Union of Labour, does disburse considerable sums in travelling benefits, but no measure of the volume of unemployment among its members is available, quite apart from the fact that the gasworkers constitute only one of the many classes of workers embraced in its membership. The only Union making provision for unemployment among gasworkers is the Amalgamated Society of Gasworkers, Brickmakers, and General Labourers, which grants an allowance of six shillings a week for four weeks in any fifty-two. The shortness of the period of relief, however, and the mixed membership of the Union, successfully prevent any measurement of the volume of unemployment among its gasworker members.

The gas industry is fortunate in one respect. Its slack season falls in the summer when the general demand for labour is greatest. If we examine other seasonal trades with a view to discover which of them offer the likeliest opportunities for dovetailing with the gas industry, we find that the building trades, brick-making, carpentering, coopering, harvesting, mill-sawing, the clothing trade, and many others are all of this kind, having their busiest seasons in one or other of the months between April and September. Not all of these, however, are available for the absorption of retort-house workers. It has to be remembered that gas-stokers and firemen are only skilled in respect of their callings in the gas works, and this not to any high degree; and the rest of them are only general labourers. Firemen and coal-porters can, and do to some extent, follow their own callings in other trades during the summer months, as on pleasure and other steamers and at the coal wharves on the lower Thames. But the majority can look only to work as labourers. The one exception to this occurs in the case of the brickmaking trade. Hand brick-making requires the same characteristics of good physique and capacity for sustained strenuous effort as does gas-stoking. In the old days when brick-making and gas-stoking were both largely manual trades, there appears to have been a regular interchange of men between the gas-works and the brick-fields, the dovetailing being almost perfect in point of seasons. The men, in fact, were men of two trades. Brick-making has now, however, become largely a machine industry and at the same time less seasonal. With regard to the London district in particular, the development of the large machine industry in the neighbourhood of Peterboro' has had the effect of shutting up many of the hand brickyards in Kent and Essex, and has thus closed one of the most suitable avenues of summer employment for gas workers.

In spite of this change there is still a considerable seasonality in brick making, and the curve of employment is very similar to that of non-employment of gas workers.

TABLE X.—*Number of wage-earners employed in brick factories in* 1907.
(Census of Production Preliminary Tables.)

January	56,200	July	63,950
April	61,445	October	57,925

Brick making too has this advantage for the unemployed gas-workers, that like one gas industry it is widely spread over the country. Further, the earnings obtainable in hand brick-making, which is paid piece-work, are as high, if not higher, on the average than those of gas stokers. I have not found, however, that there is now any considerable interchange between the gasworks in winter and the brickfields in summer. It is curious that of the fifty odd gas-workers employed in other callings in the summer months, of whom I have particulars, relating to various parts of England, Wales and Ireland, not a single one is shown as being engaged in brick-making. This may be due to a change in type of industrial character in both gas-stoker and brickmaker resultant upon the gradual displacement of hand labour by machinery. However this may be, the evidence of representatives of the gas workers is unanimous in stating that brickmaking can no longer be looked upon as a considerable field for the summer employment of gasworkers.

Other trades which are busy in the summer are not so widespread as gas-making or brick-making, and some of them vary in their seasons from place to place, notably the different branches of the building trades and of dock labour. We find accordingly that the actual summer occupations of gas workers are determined largely by the opportunities offered by each locality. Openings are found in London at the docks and in riverside work generally, as well as in coal portering; in Liverpool and at other similar ports, as firemen on summer pleasure steamers; in Doncaster as builders' labourers and navvies in the new coal area now being opened up to the south of that town; in the country districts generally in harvesting, fruit-picking and other work on the land. Other occupations of which I have note are fishing, market-gardening, fruit- and hop-picking, house- and ship-painting, carting, pump-sinkers' labouring, corn portering, coal portering, quarrying. A few men put in part of their slack season with the Naval Reserve; others (Irishmen) go to their farms in Ireland. The most frequent occupations are found as builders' labourers, navvies, firemen and stokers, and dock labourers.

An important point to notice is that these occupations are most of them of a casual nature. How far the men who engage in them are completely employed while excluded from the gas works I shall try to show shortly. It frequently happens, however, that a man is in three or four different kinds of work in the space of a few months and in considerably more different jobs.

A second point about this summer employment is that it is almost entirely unskilled work and remunerated accordingly.

Now the earnings of the different classes of labour employed in the carbonising department of a gas works are high relatively to the degree of skill involved and in some cases approach or even exceed the general level of the earnings of skilled workers in other trades. This is more evident in the London figures (which relate to over a quarter of the total workers concerned) than in those for the United Kingdom as a whole, the average being pulled down by the Irish returns.

TABLE XI.—*Average net earnings of workpeople in the undermentioned occupations in an ordinary winter week of* 1906.

(Board of Trade Earnings and Hours Inquiry.)

Occupation.	United Kingdom (all towns).			London.		
	Number.	Average earnings of all men.		Number.	Average earnings of all men.	
		s.	*d.*		*s.*	*d.*
Foremen	1,851	45	0	628	51	5
Coal porters, time	651	26	3	103	31	3
Coal porters, piece	529	41	9	403	49	3
" wheelers, time	1,048	27	7	331	27	11
" wheelers, piece	89	34	7	445	35	5
Coke spreaders and wheelers, time	2,678	28	3	915	30	0
Coke spreaders and wheelers, piece	57	30	2	36	29	6
Firemen	1,623	37	7	590	41	4
Gas stokers, time	11,511	36	2	2,608	40	5
Gas stokers, piece	144	39	0	—	—	
Retort cleaners	615	33	10	102	42	0
Pipe cleaners	785	36	3	331	40	1
Retort labourers	720	30	4	318	32	5

One result, therefore, of the forced exclusion of a man from the gas works for a period of the year is that, even if he obtains full time employment in the interval, it is usually at the sacrifice of a considerable portion of his earning power.

Another way to look at it, of course, is to consider the part-time gas-worker as primarily a casual worker who enjoys a lucky period of high wages for a few weeks or a few months every year. This was undoubtedly the case with the Irish and other agricultural workers who, when gas-stoking was much more fluctuating than at present, used to come to the gas works every winter in considerable numbers. But it is not true now for the greater number of the men concerned.

The most difficult point on which to get conclusive evidence has been in regard to the existence of actual unemployment and its extent. The registers of distress committees are strangely silent as to gas workers, the reasons being, I take it, that in the first place the registers are in many places opened only in the winter when gas workers are busy, and in the second place that an unemployed gas-worker in search of work, which must necessarily be other than gas-working, describes himself as of some occupation likely to bring him employment. This second reason also explains the absence of gas workers from the registers of the Labour Exchanges. They no doubt register, but as labourers, painters, carmen, and so forth.

The only method of investigation available appeared to be to obtain a complete history of as many individuals as possible during the time of their exclusion from the gas works. This I have done so far for four works in London, the Midlands, South Wales, and Ireland respectively. The particulars in two cases relate to the whole of the men in each works who are concerned, in the other two cases to only a section of the men. The results are therefore quite insufficient as a sample for the quantitative estimation of the volume of unemployment, but as an indication of the existence of unemployment I think they may stand.

The particulars furnished through the kindness of officials of labour organisations state for each individual the number of weeks of employment in gas works, the number of weeks of full employment in other occupations, the number of weeks of part-time employment, and the number of weeks of complete unemployment in the year. For the purpose of calculating the volume of unemployment I take the weeks of part-time employment as counting half-weeks.

TABLE XII.

	Number of men.	Number of weeks in gas works.	Number of weeks in full employment elsewhere.	Number of weeks of part-time employment elsewhere.	Number of weeks of total unemployment.
	49	1,081	831	162	474
Mean for each man....	....	22·0	17·0	3·3	9·7
Total volume of unemployment per man....	$9{\cdot}7 + \frac{3{\cdot}3}{2} = 11{\cdot}3$ weeks.				

On the average, then, these 49 men were fully employed for 22 weeks in the year at gas works and 17 weeks elsewhere, partially employed for 3·3 further weeks, and totally unemployed for 9·7 weeks. The volume of unemployment amounts to 21·7 per cent. of their whole time.

These figures, based on such scanty material as they are, undoubtedly point to an appreciable amount of unemployment among gas workers.

Changes modifying the effects of seasonality.

If we left our investigation of the facts at this point and applied ourselves to a consideration of remedies our conclusions would be seriously vitiated through the omission of a very important part of the subject. A study of the history of the industry during the last twenty years reveals a development in the organisation of gas production which puts a new complexion on the whole subject and which will materially modify our ideas as to reform.

The development of which I speak has been in two directions, involving changes in the technique of the industry and changes in the character of the consumption of gas.

The change from within may be considered under the two heads of the introduction and development of machinery, and modifications in process. Of these the first is by far the most important.

The influence of machinery.—Originally the whole work of actual production of gas—the assembly of the coal in the retort-house, the charging and withdrawing of the retorts, and the removal of the coke from the retort-house to the yard—was carried out by manual labour. The work of stoking by this method was extremely arduous, the heavy labour of drawing the hot coke from the retorts and of charging fresh coal into them by means of heavy iron scoops, 10 feet long, being carried out in very hot surroundings. From about 1860 onwards attempts had been made to devise machinery which should replace a portion of the labour in charging and withdrawing, and thus lighten the heaviest parts of the work. The first machines were too fragile for their purpose and continually broke down under the strain. Gas managers were not particularly well-disposed towards machinery, having little trouble with their men. Up to about 1890 little or no progress had been made, and carbonising was still carried out almost entirely by hand. In 1889, however, a new factor appeared on the scene in the shape of the Union of Gasworkers and General Labourers, formed in that year. This organisation had an immediate success in gaining the adherence of large numbers of gasworks employees. It was thus enabled to exert considerable pressure upon the employing concerns to grant better conditions of labour in the way of shorter hours, higher wages, and less Sunday work. One of the avowed objects of the movement was the absorption of a portion of the unemployed by means of a general reduction of hours from twelve to eight. A full history of the movement is to be found in the evidence given before the Royal Commission on Labour in 1891-92 by employers, employees, and Trade Union officials. Some of the men's demands were granted, but differences soon made themselves felt, the upshot being that several strikes of gasworkers occurred in London and in Lancashire.

These labour troubles caused gas engineers and managers for the first time seriously to turn their attention to the possibilities of stoking machinery. The first practical result was a manual stoking machine which relieved the men of the most arduous part of the work but which did not seriously reduce the number of men required. At the same time there were introduced mechanical conveyors for the transference of coal from yard to retort-house and of coke from retort-house to yard. In the case of gas concerns receiving their supplies of coal by water, a further reduction in labour was brought about by the adoption of self-acting grab-machines for the unloading of coal barges.

It must be understood that the changes of the kind I have described did not take place suddenly, or in all works simultaneously. This branch of gas engineering was in its infancy, and development at first was slow and tentative. The largest works were those to which the new devices made their strongest appeal. Many of the smaller works found the old manual stoking more economical than costly machine methods involving large capital expenditure and heavy repairing charges. By delaying the change for a few years the smaller concerns avoided the expense of setting up machinery of an intermediate type, and have in this way been enabled to instal plant of a later and more economical type at a single step. In the smallest works of all, in spite of the enormous strides which have been made in the perfecting of stoking machinery, manual stoking is still the most economical method of working.

Again, mechanical conveyance of coal and coke has not always been adopted alongside stoking machinery. At no time since manual stoking began to be abandoned at all has any one standard form of mechanical equipment held the field. In considering the effects of the introduction of machinery upon employment it is therefore always necessary to take into account the whole circumstances of any particular works which may be under consideration.

Before stoking machines were fairly established a new form of labour-saving device came into vogue in the shape of the inclined retort. It was seen that if carbonisation could be satisfactorily effected in retorts which were sloped at a considerable angle to the horizontal, the charging of the coal and the discharging of the coke could be brought about by the simple action of gravity, without the aid of machinery and with a considerable saving in labour. Among the works installing new type of plant, the inclined retort for a few years held the field. But mechanical difficulties were encountered, due mainly to the caking of the coal in the retorts. These partly neutralised the economies of the system through the extra cost involved in the labour of continually poking the coal. The advocates of machines had not been idle in the meantime, and one improvement after another was effected until the horizontal retort worked by a power machine again came to the front. Since that time very few new plants have been equipped with the inclined retort. The later forms of stoking machines are operated entirely by power, and effect a material reduction in retort-house labour. They are of several types, compressed air, steam and electricity being variously employed as the motive power. With their mechanical differences we are not concerned. Each has its advocates, and while the effect in reducing the labour of stoking is not the same in all, the differences in this respect among the various modern machines are insignificant compared with that between any one of them and the old method of manual stoking.

During the last two or three years a labour-saving device of still more pronounced type has been brought into use in the vertical retort. This can be charged and discharged by gravity and is not subject to the same disadvantages as the inclined retort. When, further, the vertical retort is worked on a continuous system, the coal being fed in automatically in a continuous stream, and the coke similarly discharged, the last word in mechanical carbonisation has been said for the present. To the gas engineer, however, the reduction of labour costs is not the only or even a prime consideration. He has to take into account the quantity and quality of both gas and coke produced; and these are dependent upon the system of carbonising adopted. Further, labour is only one item in the total cost of production; and as the capital expenditure and especially the repairs account are apt to grow disproportionately in these very elaborate mechanical devices, it may well happen that a system in which labour is reduced to a minimum is found to be not the most economical method of gas production when the total cost bill comes to be made up. It is with respect to interest, repairs and renewals that the two or three systems of continuous vertical retorts recently introduced are at present on their trial.

This, very briefly, is the history of gas engineering on its mechanical side during the last twenty years. I am now able to show you, partly from published sources and partly from information furnished to me by works managers and engineers, the effects of this development at each stage upon employment. It will be obvious to those who have followed the brief description of gas-making given above that the results of these changes are confined to the retort-house labour—the stokers, firemen, and coal and coke wheelers. The yardmen indeed have benefited by the change because the use of machinery has increased the number of mechanics required. The outside men are unaffected.

TABLE XIII.—*Comparison of costs of carbonising in hand-stoked horizontal retorts, and in inclined retorts respectively, at the Coventry gas works in* 1906-07.

Men.	Hand-stoked horizontal retorts.			Wages per ton.	Inclined retorts.			Wages per ton.
	£	*s.*	*d.*	*d.*	£	*s.*	*d.*	*d.*
Foremen stokers (proportion)	303	8	10	1·27	74	13	5	1·27
Stokers	4,401	6	11	18·47	1,125	0	2	19·19
Coal wheelers	782	7	4	3·28	112 (coal elevator men)	15	11	1·92
Coke ,,	1,569	4	1	6·58	—			—
Pipe jumpers	209	0	6	0·88	51	8	6	0·88
Removing pan ashes	245	8	8	1·03	7	16	1	0·13
Boiler and engine tenders	218	14	5	0·92	53	16	1	0·92
Total	7,729	10	9	32·43	1,425	10	2	24·31
Coal carbonised	57,190 tons			—	14,070 tons			—

It must be borne in mind in making comparisons between the costs of carbonising shown in this and the following tables that the conditions in different works vary as to the arrangements for dealing with coal and coke, and the figures are therefore not strictly comparable. In the same works, even, the introduction of stoking machinery may have been either preceded, or accompanied, or followed by the use of mechanical coal- and coke-conveyors so that the reduction in cost of carbonising is not always due wholly to the stoking machine, the inclined retort, and so on.

TABLE XIV.—*Comparison of costs of carbonising by hand stoking and by means of the Jenkins-De Brouwer stoking machine, at the West Bromwich gas works.*

	Manual stoking.	Machine stoking.
	d.	*d.*
Total labour costs (pence per ton of coal carbonised)	24·00	15·25
Other costs (pence per ton of coal carbonised)	5·04	4·52
Total costs (pence per ton of coal carbonised)	29·04	19·77

In this case some portion of the saving was due to the introduction of mechanical conveyance for coke.

TABLE XV.—*Comparison of costs of carbonising by hand stoking and by means of the Fiddes-Aldridge stoking machine at the Wavertree gas works, Liverpool.*

	Hand stoking.		Machine stoking.	
	s.	*d.*	*s.*	*d.*
Labour costs per ton of coal carbonised	2	5	1	8

In this case the stoking machine was not fully employed. It was calculated that with the machine working at its full capacity the labour costs of carbonising would be reduced to 1*s.* 3*d.* per ton of coal carbonised.

For the system of continuous vertical retorts I have no comparative figures. But at the St. Helens Gas Works the cost of labour after the coal is delivered into the bunkers (including feeding the coal into the retorts, discharging the coke from the bottom of the retorts into coke barrows, and wheeling and tipping it into the coke yard, attending to the producer, and looking after the driving engines, exhauster and pump) for a small Glover-West continuous vertical retort plant was 9·5*d.* per ton of coal carbonised. It was calculated that the plant could be doubled in size without increasing the labour required and that the cost of carbonising would in that case be 4·25*d.*

The other chief system of continuous vertical retorts—the Woodall-Duckham system—also claims to reduce labour costs of carbonising to about 4·5*d.* per ton, a result already attained in Switzerland but not so far, I understand, in this country. The actual cost of carbonising by these systems are dependent upon the methods of coke and coal handling, and the conveyor has apparently not up to the present been combined with either of the above systems.

Actual cost of carbonising by other systems at various works are shown below.

TABLE XVI.

Works.	System.	Cost.	Cost of hand stoking at same works.
		d.	*d.*
Oldham	West's compressed air combined drawing- and charging-machine	16·48 (including interest, depreciation, &c.)	43
Wellingborough....	Ditto	17·25	—
Chester	West manual-machine........	14·93	28·17
Derby	De Brouwer projector........	12·4	—

Where mechanical conveyors have been introduced it is the lower-paid labour which is displaced, but the great change has been in the replacement of highly-paid stokers by stoking machines. The wages of machine men are not very different from those of stokers, and broadly speaking, it may be said that the reduction in actual labour is proportional to the reduction in the labour costs of carbonising.

The influence of machinery on actual numbers of men employed can, however, be studied at first hand in the following tables where yard and outside men have in most cases been shown in addition to the men upon whom the influence of machinery has been greatest. The results exhibited in these tables are rather those caused by the general development of mechanical carbonising over a period of years than those of a particular type of machine, as the details of the actual appliances employed were in most cases not known.

The first table relates to a single concern at three dates in its history. In 1891, the introduction of machinery, conveyors, grabs, &c., had just begun; in 1904-5, these were established through a large part of the works; in 1910, mechanical equipment of one sort or another was complete.

TABLE XVII.—*Number of men employed in a gas works in* 1891, 1904-05, *and* 1910 *respectively.*

Labour.	June, 1891.	December, 1891.	June, 1905.	December, 1904.	June, 1910.	December, 1910.
Retort house	621	1,552	1,431	2,344	1,059	1,547
Others	2,319	2,089	3,717	3,783	4,402	4,933
Total	2,940	3,641	5,148	6,127	5,461	6,480

Percentages.

Retort house	100	249·9	100	163·8	100	146·0
Others	100	90·1	100	101·7	100	112·0
Total	100	123·8	100	119·0	100	118·6

The next table relates to a works in two periods separated by the whole change from manual stoking to modern machine stoking. It shows only the men in the carbonising department, but these in detail.

TABLE XVIII.—*Number of men employed in carbonising department of a gas works in summer and winter of the years* 1880 *and* 1910 *respectively.*

	1880.		December percentage of June numbers.	1910.		December percentage of June numbers.
	June.	December.		June.	December.	
Stokers	26	62	238·4	15	21	140
Machine men	—	—	—	6	12	200
Firemen	—	—	—	8	18	225
Retort house labourers	10	9	90	8	12	150
Coke conveyor men	—	—	—	6	4	66·6
Engine drivers	—	—	—	2	4	200
Boiler men	2	2	100	5	5	100
Coal wheelers	2	24	1,200	4	7	175
Barrow men	4	41	1,025	—	5	—
Total	44	138	—	54	88	—
Percentage of June numbers	100	313·6	—	100	162·9	—
Make of gas (1,000 cubic feet) per week	4,834	14,693	—	23,888	38,484	—
Percentage of June make	100	303·9	—	100	161·1	—
Number of retort-house men per 1,000,000 cubic feet of gas per week	9·1	9·3	—	2·2	2·2	—

TABLE XIX.—*Numbers of men employed at same gas works in June and in December weeks, at periods when manual-stoking, manual-machines, and power-machines were in use respectively.*

	Hand-stoking.		Manual-machines.		Power-machines.	
	June.	December.	June.	December.	June.	December.
Retort-house men	26	49	30	53	31	43
Yardmen	32	34	41	38	35	39
Outside men	18	21	24	24	26	24
Total	76	104	95	115	92	106
Make of gas (in cubic feet) per week	2,076,000	5,611,000	3,051,000	7,435,000	3,763,000	7,956,000
Percentage of June numbers.						
Retort-house men	—	188·4	—	176·6	—	138·7
Yardmen	—	106·2	—	92·6	—	111·4
Outside men	—	116·6	—	100·0	—	92·3
Total	—	136·8	—	121·0	—	115·2
Make of gas	—	270·2	—	243·6	—	211·4

TABLE XIX *Contd.—Number of men per* 1,000,000 *cubic feet of gas made per week.*

	Hand-stoking.		Manual-machines.		Power-machines.	
	June.	December.	June.	December.	June.	December.
Retort-house men	12·5	8·7	9·8	7·1	8·2	5·4
Yardmen................ ..	15·4	6·0	13·4	5·1	9·3	4·9
Outside men	8·6	3·7	7·8	3·2	6·9	3·0
Total	36·6	18·5	31·1	15·4	24·4	13·3

In the next table comparative figures are not available, but it relates to a works where machine-stoking was exclusively used, and the figures as to make of gas per man can be compared with the similar one in Tables XVIII and XIX.

TABLE XX.—*Numbers of men employed and make of gas in June and in December*, 1910, *at a works employing machine-stoking exclusively.*

Labour.	June.	December.	December percentage of June numbers.
Retort-house men	73	154	211
Others...............	396	438	111
Total	469	592	126
Make of gas (in cubic feet) per week.	26,600,000	53,200,000	—
Percentage of June make........	100	200	—

Number of men per 1,000,000 *cubic feet of gas made per week.*

	June.	December.	
Retort-house men	2·7	2·9	—
Others...	14·9	8·2	—
Total	17·6	11·1	—

The changes in the numbers of persons employed and in the variations between summer and winter employment at the several periods, shown in the above tables, are the result of a number of influences, of which mechanical stoking is only one. The single influence of machinery can therefore only be studied in the numbers of men employed per unit of gas made.

The bearing of the change I have described upon seasonality of employment is a most important one. The introduction of machinery has resulted in a diminution in the proportion of retort-house men to the total staff, by reason both of the decrease of stokers, firemen, &c.,

and of the increase in the yardmen (due to the greater number of mechanics required per ton of coal carbonised). There has been, at the same time, for reasons only indirectly connected with the use of machinery, an increase in the numbers of outside-men employed. The section of the gas-works employees most subject to fluctuation in employment has thus become a much smaller proportion of the total number, and the *percentage* fluctuation has been correspondingly lessened. Whether the actual number of retort-house men in the whole industry has suffered diminution I shall try and show shortly.

No measure of the influence of mechanical developments alone upon the seasonal fluctuation in employment is available for the whole industry. The foregoing figures, however, both those relating to the labour costs of carbonising and those relating to the number of men employed per unit of gas produced, mark the point to which the whole industry is tending in this respect. Not very many years ago the laborious hand-stoking predominated in all but the largest works. To-day all but the very small works have substituted machine-worked horizontal or inclined retorts, and these in their turn are being overlapped by the continuous system of vertical retorts. In many works not large enough to warrant the installation of power-machinery, the manual-stoking machine represents an intermediate stage. The combined effect of stoking-machinery and of other changes which have taken place in the industry alongside mechanical development, and which are now to be considered, can fortunately be studied for the whole industry, and a definite measure of the result obtained.

Carburetted water-gas.

Another change in the internal organisation of the industry has taken place in the last fifteen years, with results similar to, but less pronounced than, those wrought by mechanical development. This is the partial replacement of coal-gas by carburetted water-gas. It can be seen, from the description given of its method of manufacture, that carburetted water-gas is a very much simpler body to make than coal-gas, and requires considerably less labour. On the other hand the oils necessary for its carburetting are costly. We find, consequently, that while the total cost of production of water-gas is slightly higher than that of coal-gas, the item attributable to labour is about a half of that in the case of coal-gas produced by modern power-machinery, and about the same as that to which the inventors of the continuous vertical-retort systems hope to reduce the labour cost of carbonising coal. Here are some figures as to the relative numbers of men employed in the same works in making carburetted water-gas and coal-gas respectively, with the quantities of each kind of product :—

TABLE XXI.

	Carburetted water-gas.		Coal-gas. Average.
	June.	December.	
Number of men employed in gas production	56	125	110
Cubic feet of gas made per day	4,400,000	13,200,000	5,000,000
Make of gas per man per day (in 1,000 cubic feet)	78·6	105·6	45·4

The following table shows the production of (*a*) coal-gas, and (*b*) water-gas, by authorised gas undertakings since the period when the two products have been separately returned :—

TABLE XXII.—*Make of coal-gas and water-gas by authorised gas undertakings.**

Year.†	Number of cubic feet of gas made in thousands.		Proportion of water-gas to total gas.
	Coal-gas.	Water-gas.	
1898	138,147,000‡	7,404,000§	5·3
'99	147,156,000‡	10,077,000§	6·8
1900	152,008,000‡	12,108,452§	7·9
'01	156 687,000‡	15,366,000§	9·8
'02	160,579,000‡	16,868,000§	10·4
'03	164,208,000‡	17,907,000§	10·9
'04	149,895,000	18,752,000	11·1
'05	155,168,000	19,737,000	11·2
'06	161,763,000	20,078,000	11·0
'07	168,227,000	20,260,000	10·7
'08	168,290,000	21,629,000	11·3
'09	169,922,000	23,625,000	12·1

* The authorised gas undertakings constitute a majority of all gas undertakings ; and as the non-authorised undertakings comprise only the smallest works, which are not working under an Act of Parliament or a Provisional Order, the authorised undertakings represent all but a small fraction of the total productive capacity of the industry. The figures given in Table XXII represent approximately the same proportion of the total make of gas made in each period.

† See note to Table V.

‡ Including water-gas.

§ Quantity of water-gas *supplied*.

It is thus seen that while the proportion of water-gas to total gas made increased rapidly at first, it has remained almost constant in the last six years.

The conditions determining the production of water-gas are four. In the first place a water-gas plant is much more elastic than a coal-gas plant. It can be put in operation at short notice; and unlike coal-retorts, which must be worked continuously, it can be worked for a few hours at a time and then shut down. A water-gas plant is thus extremely useful as a stand-by in cases of sudden emergency, such as a heavy winter fog.

Further, the illuminating power of carburetted water-gas is greater than that of coal-gas made from the varieties of coal now usually supplied to gas works, and the addition of water-gas thus raises the candle power of the mixture of the two, which is the form in which the water-gas is sold. A slightly higher initial cost may thus be compensated by the use of inferior and therefore cheaper coal.

Again, while the cost as delivered in the holder is nominally higher for water-gas than for coal-gas, this is partly determined by the value of coke in each locality. It may well happen that in a town where the demand for coke is small, it pays to make the excess of coke produced in the coal-retorts into water-gas rather than to sell it in the open market.

On the other hand water-gas is extremely poisonous, and demands elaborate precautions to be taken against the slightest leakage in both "producer," "carburettor," and "purifiers," as well as in the pipes. For this reason many gas-managers refuse to have anything to do with it. Of the 794 authorised gas undertakings in 1909, only 135 made water-gas at all. The percentage admixture of water-gas with coal-gas is, on the average, about 30 per cent., though in some cases it rises to over 50 per cent.

It is impossible to say whether conditions are likely to arise under which the replacement of coal-gas by water-gas will be accelerated. A limit is fixed to its extent by the dependence of the water-gas plant upon coke produced in the coal-gas department —unless coke is to be purchased outside, an unlikely event. But this limit has been far from reached for the whole industry.

Though it reduces the labour of production by 50 per cent., the effect of the use of water-gas upon fluctuation in employment has so far been but slight, owing to the small aggregate quantity of it made. And this effect is likely to diminish with the increasing efficiency of stoking-machinery.

Changes in character of demand.

The other kind of change affecting seasonal fluctuation in employment to which I referred relates to the growth of new sources of demand for the product which are almost independent of season. This is a change outside the control of the industry itself, but it has been carefully fostered by those responsible for the working of gas-undertakings. Gas companies and authorities nearly always offer a lower rate for gas consumed in manufacturing operations and the growth of consumption in this direction during the last ten or fifteen years has been remarkable. It is impossible to obtain any measure of this change, but some idea of its importance may be gained from the mention of a few of the chief manufacturing operations in which gas is now employed. The use of the gas-engine for power purposes is a development of quite recent years but its growth in favour has been rapid, and the number of such engines at the present time must be considerable. The larger gas-engines are provided with their own equipment for gas production, but for engines of less than 150 H.P. the manufacture of "producer" gas *in situ* is uneconomical. The smaller gas-engines are run almost exclusively by gas purchased from public gas undertakings. But gas-engines are not the only field of employment of gas for industrial purposes. The Gas Light and Coke Company in London has a consumption of millions of cubic feet a day by the big newspaper companies. The *Times*, the "Associated Press," *Lloyd's*, and the *News of the World* all use gas under pressure for the purpose of melting their type-metal. The Birmingham Corporation supplies gas under pressure for melting purposes to a large number of the metal-working shops of that city. A town of so slight an industrial character as Edinburgh finds it profitable to supply gas at a specially low rate when applied to the following purposes :—gas-engines, branding-machines, linotype-machines, laundry-machines, kilns, coffee-roasters, blow-pipes, bronzing-machines, heating-irons, soldering-apparatus, tailors'-irons, upholsterers'-irons, laundry-irons, enamelling-stoves, muffles, drying-stoves, gas-hammers. These are but a few examples. The importance of this development from the point of view of the subject under consideration lies in the fact that consumption of gas for these many industrial purposes is independent of climatic conditions and is subject only to the ordinary exigencies of productive industry. To the extent to which gas is used in manufacture seasonal fluctuations in production practically disappear.

A second factor which has exerted a profound influence on the climatic fluctuation is the increasing use during the last ten or fifteen years of gas for domestic, *i.e.*, cooking, purposes. It is interesting to learn that the period of greatest consumption of gas during the year from one of the large London companies occurs, not as one might imagine on a foggy day in winter, but during a couple of hours in the forenoon of a Sunday in summer ; and this entirely through the demands of the domestic gas-stove. The effect of the growth in consumption of gas for domestic purposes is greater than that of its increasing use for manufacturing purposes because recourse is had to the stove to a greater degree in summer when there is no kitchen fire to be utilised than in winter. Hence a counter season is set up which tends to neutralise the effects of climatic conditions.

The increased use of gas for stoves can be illustrated in an indirect way by considering the growth in stove-rentals over a period of years. The following figures are taken from Field's Analysis of Gas Accounts and go back to 1898, the first year in which stove-rentals are shown separately from meter-rentals. The twelve suburban companies of the London district have been chosen on the ground that they constitute the largest group of concerns for which complete particulars for the whole period are furnished in the Tables. The true basis of comparison is found, not in the aggregate stove-rentals, but in stove-rentals relatively to sale of gas. The figures take no account of the use of stoves by people who own them; further, they include in some cases the rentals of fittings as well.

Table XXIII.—*Stove-rentals per* 1,000 *cubic feet of gas sold, charged by the Brentford, Bromley, Croydon, South Suburban, Hornsey, Lea Bridge, Mitcham, Richmond, Tottenham, Wandsworth, West Ham, and West Kent Gas Companies in each year from* 1898-1909.

Year.	Stove-rentals per 1,000 feet of gas sold.	Year.	Stove-rentals per 1,000 feet of gas sold.	Year.	Stove-rentals per 1,000 feet of gas sold.
	d.		*d.*		*d.*
1898........	0·61	1902........	0·90	1906 ...	1·49
'99........	0·67	'03........	1·02	'07	1·63
1900........	0·75	'04........	1·17	'08	1·75
'01	0·81	'05........	1·32	'09	1·90

The combined effect of the increasing use of gas for purposes other than illumination is exhibited in the following figures showing the consumption (or production) of gas by various companies by day and by night in the busiest and slackest weeks respectively in 1910 and in an earlier year.

Table XXIV.—*Normal day's consumption from a gas-works in January and June respectively, in the years* 1903 *and* 1910.

Year.	Period of day.	Normal day in January.		Normal day in June.	
		Thousands.	Percentage of day's make.	Thousands.	Percentage of day's make.
1903....	6 a.m. to 6 p.m.	47,757	53·6	22,634	50
	6 p.m. ,, 6 a.m.	41,329	46·4	22,621	50
'10....	6 a.m. ,, 6 p.m.	56,165	55	30,221	54
	6 p.m. ,, 6 a.m.	46,335	45	25,335	46

TABLE XXV.—*Summer and winter consumption of gas at a gas-works in the south of England in* 1900 *and* 1910, *respectively.*

Period.	Day (6 a.m.—6 p.m.).	Night (6 p.m.—6 a.m.).	
		Actual consumption.	Percentage of day consumption.
	cubic feet.	cubic feet.	
June 23, 1900	9,936,000	11,764,000	118·4
December 22, 1900	21,896,000	21,814,000	99·6
June 25, 1910	14,961,000	12,595,000	34·2
December 24, 1910 ...	24,967,000	23,871,000	95·6

TABLE XXVI.—*Summer and winter consumption of gas at Stretford gas works* (*in* 1,000 *cubic feet*).

	Summer.		Winter.	
	Day (6 a.m.—6 p.m.).	Night (6 p.m.—6 a.m.).	Day (6 a.m.—6 p.m.).	Night (6 p.m.—6 a.m.).
1890....	32	148	168	421
1909....	369	375	730	966

TABLE XXVII.—*Output of gas at Great Yarmouth in millions of cubic feet, and proportion due to day consumption.*

Year.	1887.	1897.	1902.	1905.	1908.
Yearly total gas sold.... ..	109	132	158	158	175
Day percentage	28	37	42	43	45

The significance of the growth in day consumption in recent years lies, of course, in the fact that it represents consumption for purposes other than illumination and subject, therefore, to little seasonal variation. The greater the correspondence between day and night consumption the greater also that between summer and winter consumption.

The effect of these changes in the character of consumption is not separately capable of definite measurement over the industry as a whole. It varies from works to works in accordance with the industrial character of each locality, and also with the policy pursued by the gas company or local authority in the matter of differential rates. It may be noted, however, that development in the direction of balancing the load of production as between summer and winter is more valuable from the point of view of the gas operative than the changes wrought by the use of machinery, because in the former case regularity of employment is accompanied rather by an increase than a decrease in the total numbers employed.

The combined influence upon the problem of regularity of employment of all the changes in both production and consumption which we have been considering, is exhibited in the case of individual concerns in Tables XVII—XIX; a measure of it is furnished in the statistics of the two inquiries into earnings and hours carried out by the Board of Trade for the years 1886 and 1906 respectively. We have seen what proportion of the whole trade is covered by the 1906 figures. Those for 1886 relate to 60 per cent. of all gas undertakings and are, therefore, thoroughly representative.

TABLE XXVIII.—*Number of workpeople employed by gas undertakings furnishing returns.*

	1885.		1906.	
	Number.	Percentages.	Number.	Percentages.
Number of persons employed in *maximum* weeks	35,737	153·4	71,854	120·4
Number of persons employed in *minimum* weeks	23,283	100·0	59,691	100·0

The first set of figures relates entirely to the method of stoking by hand. Water-gas, again, had not entered the field, and the application of gas to industrial and domestic purposes was in its infancy. It is impossible to compute the extent of the use of machinery in 1906, but generally speaking it may be said that at this date the large works were employing in carbonisation mainly labour-saving appliances of one kind or another, the small works mainly hand-labour. We have seen to what point the opening up of new avenues of consumption had advanced at this date.

The fluctuation thus decreased in the course of twenty-one years by nearly forty per cent. Since 1906 progress in the replacement of old plant by new has been continuous, so that a materially larger proportion of concerns are employing machinery now than in 1906. Development in the other directions has been more than maintained. I think it is not an unwarrantable conclusion that the maximum fluctuation in employment of gasworkers at the present time does not exceed fifteen per cent.

Effects upon total numbers employed in the industry.

We have seen that developments in the science of gas engineering have resulted in a material decrease during the last twenty years in retort-house labour per unit of gas produced. Each introduction of a new mechanical appliance causes for the time being an increased staff of mechanics. But while the diminution in the labour-cost of carbonising has been continuous throughout the period, there is no evidence to show that the labour-cost of repairs has similarly expanded.

The mechanical difficulties are greatest while a new system is still in its experimental stages, but every effort is made to avoid the repetition of breakdowns and the necessity of frequent repairs. For any one method of working the cost of repairs and renewals tends steadily to diminish. In the following table, taken from Field's Analysis of Gas Accounts, are shown for the Gas Light and Coke Company of London (*a*) the labour-cost of carbonising per 1,000 cubic feet of gas sold and (*b*) the total cost of wear and tear per 1,000 cubic feet of gas sold, over a period of years. A third column is added showing the total distribution-charges per 1,000 cubic feet of gas sold, to which I shall have to make reference shortly. The wear-and-tear-charges include both labour and materials, but it is a fair assumption that these items are in about the same proportions in each period.

TABLE XXIX.

Year.	Wages (carbonising) per 1,000 cubic feet of gas sold.	Wear-and-tear per 1,000 cubic feet of gas sold.	Total distribution-charges per 1,000 cubic feet of gas sold.	Year.	Wages (carbonising) per 1,000 cubic feet of gas sold.	Wear-and-tear per 1,000 cubic feet of gas sold.	Total distribution charges per 1,000 cubic feet of gas sold.
	d.	*d.*	*d.*		*d.*	*d.*	*d.*
1873....	5·28	4·29	2·00	1894	4·27	4·13	2·56
'76....	3·68	5·01	1·87	'97....	4·19	3·48	2·93
'79 ...	3·49	5·93	2·39	1900 .	4·06	4·34	3·44
'82 ...	3·33	4·83	1·83	'03....	3·33	4·06	3·31
'85....	3·32	4·40	1·92	'06....	2·56	4·25	3·92
'88....	3·34	3·22	1·73	'09 ...	1·90	4·08	5·31
'91*	4·56	3·91	2·31				

* The sudden advance in the figures between 1888 and 1891 is due to the introduction of the 8-hour day in place of the old 12-hour day, which began with this Company in 1889. The amount of work per man was not reduced in the proportion of 3 to 2, as the men did only a sixth less work in the 8-hour shift than in the 12-hour shift. But wages per shift remained the same, and the cost of the change, which was thus borne entirely by the Company, amounted to 70,000*l.* a year in wages. Part of the increased cost was met by the introduction of machinery about the same period, but the combined effect of the reduction of the hours from 12 to 8, of the introduction of machinery and of the increase in production which took place in this period, was to increase the total wages of production, repairs, and distribution per ton of coal carbonised from 7*s.* 3*d.* to 9*s.* 5*d.* between 1888 and 1891.

Wages paid per ton of coal carbonised.

Year.	Carbonising, coke handling, and by-products.		Repairs and distribution.		Total.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*
1888..............	5	1	2	0	7	3
'89	5	8	2	2	7	11
'90...............	6	10	2	4	9	7
'91...............	6	8	2	3	9	5

Column 1 exhibits the steady decrease in the labour-cost per unit of gas. In column 2 we see that the wear-and-tear-charges have decreased when the cost of carbonising has remained about stationary, and increased with each considerable decrease in Column 1. On the whole, however, there has been no material increase in wear-and-tear costs over the whole period. It is evident, therefore, that in the long run the decrease in retort-house labour consequent upon the introduction of machinery has not been in any way compensated by the increase in yardmen.

The increased use of gas stoves and the introduction of the incandescent mantle have called forth new classes of labour for installation, repair and maintenance work in connection with these appliances. This belongs mainly to the class of "outside men," and the movement is reflected in the increased distribution-charges shown in column 3 above. It is not possible to estimate the proportion of this increase which belongs to labour alone, and thus determine whether in a single works the total labour per unit of gas is constant, or increases, or diminishes.

While the proportion of retort-house labour to total staff has thus been diminishing, the liability to unemployment of retort-house men depends upon the actual numbers employed at different periods, and these again depend upon the relative rates of decrease in retort-house labourers per unit of gas produced and of increase in total production of gas. The former rate cannot be measured for the industry as a whole, and the only method of determining whether the improvements in the matter of fluctuation of employment by the various changes in both production and consumption described above have been effected at the expense of the total number of men employed in connection with the service of gas supply, is to see how this number has varied over a period of years.

Though some of the changes have been taking place since about 1890, they have been largely concentrated into the last twelve years, and until the results of this year's Census become available, the statistics of the occupational census are useless for the purpose in hand. The only material that can be used is information contained in the Factory Department Returns of persons employed in non-textile factories under the heading "gas." These are subject to the limitations described in an earlier part of the paper, the most serious of which from the present point of view are the incompleteness in individual returns made, the probable omission of "outside men," and the possible omission of the "tradesmen" (*i.e.* the mechanics, fitters, carpenters and plumbers) due to the return of these under headings other than "gas."

TABLE XXX.—*Number of persons employed in non-textile factories returned to the Home Office as being employed under the heading "gas."*

Year.	Number of returns received.	Number of outstanding returns.	Number of earlier returns used for the outstanding returns.	Number employed.
1895	568	5	—	52,120
'96	628	7	—	51,702
'97	690	10	—	53,475
'98-99....	776	6	—	57,101
1901	1,071	—	—	66,619
'04	1,018	153	95	62,784
'07	1,187	214	141	62,234

The figures for the later years are more defective than those for the earlier years both because "outside men" (not included) now comprise a larger proportion of the total numbers in the industry than formerly, and also on account of the larger number of outstanding returns in 1907. Even allowing for these necessary corrections the results are inconclusive. It can be said, in a very general way only, that the rate of increase in the numbers employed in the industry has been less rapid in recent years than formerly and that it may have already reached a standstill or even be declining. If this is the case then not only the relative but the actual number of men subject to potential unemployment is on the wane.

Conclusion.

It is not my intention to proceed from the facts revealed in this inquiry to a consideration of remedies. My object was rather the collection and analysis of the material than the advocacy of a policy. Without, however, venturing on the domain of the politician I may be allowed to discuss the probable course of the development which we have seen to be already at work in the industry.

As the inquiry proceeded it became more and more evident that the industry contained within itself the seeds of growth towards greater and greater regularity, and it is for this reason that I have devoted what you may consider a disproportionate part of my space to the study of the evolution in the internal conditions of the industry. To what I have said as to the future of water-gas I have only to add that in America water-gas enriched with naphtha has largely replaced coal-gas in many of the large cities. The result of a similar change in this country would be, not to modify the seasonal fluctuation among the men engaged in actual production, but to reduce these to probably a third of those now employed in making the same quantity of coal-gas. There is no evidence to show that such a change is probable.

In the other directions in which changes are at work, especially on the side of consumption, the rate of progress will undoubtedly continue and probably be accelerated. As long, of course, as the production of gas is determined jointly by its use for a purpose which is subject to a seasonal fluctuation and its use for purposes which are practically independent of season, complete regularity cannot be attained. But it is a reasonable assumption that in no very long time continued development upon present lines will have reduced the number of men in the industry subject to potential unemployment to a small fraction of the whole.

It remains to add that the present investigation was carried out at the London School of Economics under the direction of Mr. Sidney Webb, to whom, and to the many gas engineers and managers, Trades Union officials, and others who have kindly assisted me in many ways my thanks are due.

APPENDIX.—*Particulars of gas companies with profit-sharing or co-partnership schemes in operation in* 1909.
(From *Labour Co-partnership* for January, 1910.)

Name of Company.	Number of years scheme has been in operation.	Capital in 1909, total share and loan.	Number of employees under agreement of profit-sharing and co-partnership.	Amount divided among employees for year ending June, 1909.	Amount per cent. on wages.	Total profit to employees since adopted.	Amount of shares and deposits held by employees in the company, market value, June 30, 1909, about	May employees be on the Board of Directors.	Number of employees' representatives on Board.
		£		£		£	£		
South Metropolitan	20	8,325,340	5,138	37,123	7½	464,347	375,000	Yes	2 Workmen's 1 Officers'
Commercial	Since 1901	2,528,280	1,221	5,417	5	40,089	43,920	No	None
South Suburban......... ..	,, 1894	831,363	582	3,034	6	33,452	34,637	Yes	2
Newport	,, 1900	318,380	156	384	3·41	3,180	3,607	No	None
Chester	8	242,190	66	297	5	1,916	1,610	No	None
Leamington	1½	79,790	116	413	5	625	670	No	None
Rugby	—	—	—	—	—	—	—	—	—
Walker and Wallsden	1	272,918	99	360	4	360	423	No	None
Wrexham	1	109,290	61	Dec. 31, '08 256	6	256	None as yet	No	None
Tunbridge Wells	Since June 30, '08	174,000	130	425	4	425	550	No	None
Tottenham	—	723,410	601	2,300	4⅞	6,272	Shares 7,914 Deposits 4,356	No	None
Croydon	Since Dec. 13, '08	690,612	478	1,245	3	1,245	—	No	None
Gloucester	1	228,000	113	361	5	361	—	—	—
Bournemouth.......	1	651,259	390	1,609	Sliding Scale depending on price of gas	1,609	1,609	No	None
Wellingborough	1	90,853	59	242	5	242	242	No	None
Gas Light and Coke	Since Jan. 1, '09	27,452,193	8,439	38,683	5	38,683	None	No	None
Grantham	No figures	till after	March	next.					
Cardiff	Since June, '09	645,085	185	655	4	655	Nil	No	None
Watford	Since July 1, '09	165,532	106	Nil	—	—	—	No	None
Total		43,528,495	17,940	92,804	4·85 average	593,717	474,538		

The Board of Trade *Labour Gazette* for October, 1910, shows two other companies, and also gives particulars of the Grantham Gas Company :—

Company.	Date of adoption of profit sharing.	Number of employees in 1909.	How bonus treated.
Cambridge University and Town Gas Light Company ...	1909	182–249	Retained in Company for investment in ordinary stock until £20 worth held: then part invested with Company, part withdrawable in cash.
Dartford Gas Company	'09	45–51	Retained by Company for investment in stock.
Grantham Gas Company	'09	47–56	Much the same arrangement as at Cambridge.

DISCUSSION *on* MR. POPPLEWELL'S PAPER.

MR. A. W. FLUX, in proposing the vote of thanks, referred to an observation by Mr. Sanger earlier in the evening expressing the satisfaction which the Society felt in the appearance of fresh names on the programme of the current session, and hoped they would continue to get fresh material from fresh minds. Another satisfactory feature in the Paper was the sense of reality resulting from the way in which the figures were used as illustrations of industrial conditions. The difficulties of obtaining the data necessary for studying the problems of employment even in a comparatively small industry were very well shown by Mr. Popplewell, and in themselves provided food for reflection. The Gas industry employed perhaps not more than 80,000 at the outside, and if they put the figure at between 70,000 and 90,000 they would apparently be quite outside the actual figure in both directions. That number was small considering that the industry was scattered all over the United Kingdom and was to be found in any town of moderate size, but the materials for measuring the important social connections of the industry were far from satisfactory, and he thought Mr. Popplewell had made excellent use of the available official sources and had shown that it was possible by reasonable hypotheses to fit together the somewhat disconnected figures from different sources, which were prepared for different purposes, and therefore connoted different facts. Another thing of great interest in the Paper was the way in which it illustrated the effect upon individuals of irregularity of employment. The investigation of what was in itself a comparatively small number represented a good deal of work in gathering the details together.

Mr. Popplewell stated that certain individuals who, for the lack of better information, might be taken as typical, were experiencing unemployment to the extent of 22 per cent. of their time. As these irregularly employed individuals were derived from a class including less than half, probably not more than one-third, of the persons employed in the industry, a comparatively small percentage of unemployment throughout the industry might yet represent a distressing amount of unemployment to those persons who had to bear the brunt of the unemployment. Such an investigation as Mr. Popplewell had made was very useful, and it would be helpful if a similar examination in regard to all the industries of the country could be made so that they might understand what possibilities there might be of fitting together employment in the different industries and finding out what was inevitable in the way of unemployment and what was not inevitable. They must not jump to conclusions with regard to the tendency of changes in production and in consumption. Mr. Popplewell distinctly suggested that they must be careful in drawing conclusions as to what was likely to happen from the extension and development of particular trades. The more they really knew about a trade the better they could get the statistics brought into line and the better they would understand the problems occupying public attention at the present time connected with the irregularity of employment. There was a certain appropriateness about the presentation of the Paper just now, and they should express their thanks to Mr. Popplewell for having brought this subject before them. He might perhaps add one word as to the satisfaction with which the Royal Statistical Society must regard the development of work at the London School of Economics which could turn out at comparatively short notice a Paper of the value which had been offered them to-night.

Mr. S. ROSENBAUM, in seconding the vote of thanks, expressed the great pleasure with which he had listened to this very valuable contribution dealing with the important department of industrial economics. Mr. Popplewell had referred to the absence of any material on which to base satisfactory statistical information, but anybody who had read the Paper would agree that the author had made excellent use of the available material, and had given a full description of what was happening in the gas industry. The industry was one which gave employment at different times of the year to numbers ranging from 63,000 to 78,000, and those unemployed at some time of the year amounted to 15,000 people. That in itself was a very considerable number, but its seriousness was aggravated by the fact that, as Mr. Popplewell pointed out, practically the whole of that fluctuation arose, not in the trade as a whole, but only in a certain department of the trade—amongst retort-house men who represented only 40,000 of the number employed in the industry. Another aspect of the question developed in the Paper was that by comparison with an earlier period the range of employment was very much smaller than it was twenty or thirty years ago. The Paper contained some valuable figures which seemed to suggest that amongst the retort-house men the difference of employment between winter and summer was formerly as 250 to 100, and that at the present time that had been reduced to a proportion of 146 to 100. That was a very valuable and important change in the industry; and it had this other aspect which detracted from the change, that whereas people in the old days were able apparently to find work comparatively easily in other industries, they now found it less easily. In the old days brick-making appeared to have been able to absorb the whole of the excess, but it now did so only to a very inconsiderable extent. He did not know whether he was correct in suggesting that the explanation of that was to be found in greater specialisation even among unskilled labourers of that class, even among stokers, in order to enable men to get employment in the gas industry; in consequence of greater specialisation the general labourer was less an all-round man and less capable of adaptation to other industries. Moreover, the concentration of employment in large towns made a man more reluctant than before to migrate to agricultural districts so far afield in order to take employment. There was one other point for speculation arising on the Paper. What possibility was there for reforming the conditions which brought about this large mass of non-employment? He preferred to call it non-employment rather than unemployment. It was not at all certain that there might not be some compensating influences at work. He had been told that there was always the possibility of effecting a smoothing in the gas engineering trades at different times of the year. As to the suggestion of Mr. Popplewell for the use of gas for other than lighting purposes, such as cooking and heating, gas must be employed to a very much larger degree than at present if they were to effect any satisfactory remedy. What was needed in the summer months when the demand for lighting was at a minimum was that the consumption of coal in the grate should be reduced to a minimum, and that instead coal should be used in the retort for producing gas to be used for gas heating and gas cooking. He had been told that gas was not likely ever to be adopted for cooking and heating to any considerable degree unless gas companies were prepared to give very much cheaper rates to the ordinary domestic consumer, but that was not a difficulty which ought to stand in the way. It might be necessary to ask for a graduated rate in the case of large consumers taking a permanent supply of gas for cooking and heating. There was no probability apparently of reducing the fluctuation in employment by any greater use of gas for power purposes. He wished it were possible for Mr. Popplewell to supply the variations week by week or month by month during the year in the gas supply and the fluctuation hour by hour in the consumption. He wished also that Mr. Popplewell would investigate one other question, namely, how the earnings did actually fluctuate week by week and month by month. The numbers employed at different times did not give an altogether satisfactory indication of the variation in unemployment, for, as had been pointed out, there were adjustments within the industry itself which might change the volume of employment without corresponding alterations in the numbers employed. He would also like to ask whether in the figures of stove rentals a correction had been introduced allowing for the change in the actual rentals charged at different times. He believed there had been a reduction in the rental charge for stoves in the period of years under investigation.

The PRESIDENT said he wished to associate himself with the approval expressed of this very valuable Paper, which dealt with a subject interesting to them all, and especially to himself. It was a very creditable piece of work, and it had been very rapidly put together. Its value lay in the fact that an industry had been taken which gives to the great mass of its *employés* regular and continuous work. There were, however, fluctuations in it, and what Mr. Popplewell had shown was that the fluctuation falls almost entirely upon one or two classes of *employés*, and that therefore the pressure upon that particular class was a great deal heavier than would at first sight appear. He hoped that the success of the Paper would encourage others to try and make similar investigations concerning trades or industries which were in a similar position. If that could be done, they would be able to get more and more trustworthy data of these seasonal fluctuations, and they would then be able better to form their own conclusions as to how far they were inevitable. The facts so obtained might be utilised in seeing what means might be taken for handing over those not in employment to other occupations and industries which were purely seasonal, and which might be able to give employment at the particular time when the diminution in number of those employed in the gas industry occurred. One of the great difficulties in dealing with this question of unemployment was that they had no trustworthy figures. The returns made by those not in employment or temporarily out of employment were not in any way trustworthy; but if they could begin at the other end, at the employing industry, and extend their observations so far as to be able to bring within their purview a large number of industries in which there was seasonal fluctuation, they would, he thought, get much more reliable information, and be in a better position to see what could be done to stereotype employment, or, if there must necessarily be these fluctuations, to see how best they could be utilised. The Paper was most interesting and instructive.

Mr. POPPLEWELL thanked the President for the kind words he had used about the Paper. With regard to the concentration of non-employment upon one particular class of worker to which the President had referred, it was from one point of view perhaps rather fortunate that unemployment was concentrated on one class of workers, because when a problem of that kind could be isolated it became more easy to treat. With regard to Mr. Rosenbaum's remarks, no correction had been made for stove rentals because the figures in the Paper related to twelve companies, and unless one had specific figures for each of the companies he did not see how it could be possible to introduce the corrections. The figures were only given as an indication of the growth in the use of gas for domestic purposes, and were not intended as a quantitative measure With regard to the comparison of earnings during employment, he did not think that was a matter of very much importance, because employment in the gas industry was, as a matter of fact, very regular. There was very little lost time. With regard to the change of shift between summer and winter, the change from two shifts in winter to three in summer occurred only in a single works, so that, having regard to the 70,000 or 80,000 men employed, the error introduced would be of no consequence. Mr. Rosenbaum had said that the only possibility of regularising the industry effectually was to see that the summer consumption was more or less equalised to the winter consumption. He had, however, hinted at a course which might be adopted with advantage under present conditions, viz., the practice of organised short time in summer. In the particular case in which the change in length of shift occurred it had been decided upon by the men themselves. It was one of the works of the South Metropolitan Gas Company, who had six works, in three of which they worked two shifts throughout the year, in two of which they worked three shifts throughout the year, and in one of which they changed the shifts between summer and winter. In each of these six works the men had been allowed to decide the matter for themselves. It had been suggested to him that the reason why this method of inducing regularity of employment had not taken place was because the men were not willing to suffer the reduction in wages which would occur. As to Mr. Rosenbaum's suggestion that the greater difficulty of finding work now experienced by the men who were displaced in the summer months might be due to specialising amongst unskilled workers, he was not at all sure that the actual volume of unemployment amongst displaced gas-stokers was greater now than it was twenty or twenty-five years ago. He only quoted the case of brickmaking because the two trades dovetailed into each other, and brickmaking had been a large avenue of employment for displaced gas-workers in summer. Whether the actual volume of unemployment was greater or less he did not think there was any sufficient material to show.

The following candidates were elected Fellows of the Society:—

Felix Cassel, K.C., M.P.
Arthur James Cook, A.I.A., M.I.I.
Archibald Cameron Corbett, M.P.
Sir Clifford John Cory, Bart., M.P.
Moreton Frewen, M.P.
The Rt. Hon. Viscount Gough, K.C.V.O.
Harry Hewitt Griffin, M.J.I.
John Cranfield Hicks.
John Sharp Higham, M.P.
Rt. Hon. Lord Joicey.
The Hon. Joseph Martin, M.P.
James Francis Mason, M.P.
Sir Alfred Moritz Mond, Bart., M.P.
The Rt. Hon. Lord Monkswell.
The Rt. Hon. Lord Wandsworth.
His Grace the Duke of Wellington, K.G., G.C.V.O.
T. Taliesin Williams, B.A.
Walter Anwyl Willington.

MISCELLANEA.

I.—*The Provisional Totals of the Census of India.*

By Sir J. A. Baines.

The fourth general census of India was taken on the night of March 10 last, and on the 20th of that month a return was published by the Government showing the distribution of a population of 315,001,099, by sex and in territorial detail, together with the corresponding figures at the last census and the relative difference. A jaundiced critic might suggest, perhaps, that the odd ninety and nine persons were added, like the half wheatsheaf of the French statistician, to carry conviction to those to whom millions are but as tinkling cymbals, but their existence is duly accounted for in the tables, which, indeed, have been compiled with a scrupulous regard for truth that even admits the omission of a "jeune Mortara," estimated for but not counted, in consequence of the *laches* of the sub-official of a distant post in Burma. The difference between the first and the final count in India has never been material, so it may be assumed that within 100,000 or so the actual population of the Indian Empire is as stated above. To record this vast aggregate in one night and to compile the results within nine days, are feats which may fairly be said to establish a record of statistical expedition. It will be interesting, probably, to some readers of the *Journal* to learn how the operations were organised and carried out which led to these results. The main features of the census scheme in India have been already described before this Society, especially in regard to those in which it differs widely from that adopted in this country. In brief they are as follows. The topographical preparations are easy in comparison with those here, as the rural inhabitants are congregated into well-defined sites, and revenue officials are available, equipped with full local knowledge, and competent, under guidance, to carry out all preliminary arrangements. The latter are much heavier than in this country, but the machinery is more adapted to the task. Few of the householders can even read, and a mere handful can grasp the instructions for filling up a schedule, which, *mutatis mutandis*, is as full of pitfalls in India as in the rest of the be-censused world. The whole of the record, therefore, has to be entered by an enumerator, as dictated—not without loud and prolonged argument—by the householder. This duty cannot of course be left over till the census night, so it is done in rural tracts about a month, and in towns, a week or so before the census. This preliminary record, it should be noted, stands good to an extent hardly credible, for, such is the immobility of the population in question, that, roughly speaking, 95 per cent. of the schedules are unchanged at the final check. The interval between the two operations, moreover, allows plenty of time for the inspection and correction of the enumerators' work by the supervising officers. The enumerators, who at this stage are usually subordinate officials, are duly had up in classes and instructed long before the schedules are made over to them; and the *virâ voce* on the occasion, when every available bystander is enumerated willy-nilly as he stands, is a sight not to be forgotten. A few days before the census night, the establishment is placed, as it were, on its war footing, and mobilised for active service. Public offices are closed except for emergent work, and every *employé* is detached for some census work or other. Volunteers, enrolled beforehand, and instructed like the officials, are posted near their homes. The ready response to the call, and the keenness and goodwill with which they enter into their work are amongst the most gratifying features in the operations, and have been specially recognised by the Government. Altogether 2,000,000 enumerators scoured the countryside from sunset till midnight on March 10, every one with from 30 to 50 houses to visit, reading out at each the preliminary entries and correcting the record up to date. Meanwhile their supervisors circulated through the ten or twelve blocks under their charge, on ponies, camels, elephants, bicycles, and even, it is said, in cars lent by sympathetic magnates for the job. As soon as their round was over, the enumerators scampered to the appointed place of tryst, and delivered their record to the supervisor for final scrutiny. On receiving it back, totalling begins. Every circle officer tries to be the first to get his summary into the sub-divisional office, and puts forth as much strategy in commandeering all possible means of rapid conveyance as a British election agent. Snow or rain fell throughout the Himalayan region, and the rivers rose, but where the ferries could not ply the return was borne across by lusty swimmers. In the plains the bearers of "the good news" were sometimes sent off (as from Ghent) in pairs or more, handing on the precious packet as they respectively broke down. At the sub-divisional office squads of clerks are told off for the compilation and check of the circle summaries, and the tale when completed is wired to the district or State centre, and thence to the Census Commissioner in Calcutta. The latter received some of these totals within eight hours of the close of the census, and by the fifth day over 70 per cent. of them had reached him. Within a week or ten days, tabulation was in full swing in many centres—that is, the individual "slips" were being copied from the schedule, and arranged in their pigeon-holes for compilation.[1]

Quite apart from the advantage of getting these provisional totals in early, the keenness of emulation shown throughout leads undoubtedly to better work, and gives a most useful impetus to the inception of the second stage of census work.

As to the results of the census, comment must for the present be on the broadest lines only. Life in India is so diversified by physical and social conditions, and so apt to be affected by influences of a character purely local or temporary, that the general conclusions to be drawn from the bare statement of variations are but few, and the true bearing of the figures will only appear in the light of explanations provided by local experience. Two features, however, stand out prominently in the return. First, the low rate of growth compared with that of most other enumerated countries; and, again, the apparently slower increase of the female population as compared with that of the other sex. In regard to the former, the increase of 6·4 per cent. in the ten years does not appear to be lower than the actuarial experience of the last thirty or forty years would lead one to expect. In a decade of almost unbroken prosperity the rate only reached 9·8. Two of the other periods included years of more or less severe drought, and though the last ten years have been free from serious famine, and, over the greater part of India, have been generally favourable to the agriculturist, the prevalence of plague in Bombay and Upper India, together with an unusually virulent epidemic of malarial fever along the Jamna and upper Ganges, has been enough to check the advance of these densely-peopled regions. There are signs, too, of a retardation in the growth in population in the most densely-inhabited tracts of other parts of the country. Apart, moreover, from temporary influences, the remarkably high birth-rate in India, due to the universality of marriage, is accompanied, as elsewhere, by a very high mortality, so that the annual rate of "natural increase," which alone is of material importance at present, is not higher than 6 or at most, 7 per mille. In several parts of India severely affected by famine in 1899-1900, there is recorded the extraordinary rebound in population which invariably follows prolonged scarcity, if unchecked by epidemic disease; but in the United Provinces and the Panjab the numbers have fallen off. It is in these two Provinces, also, that the decrease in the proportion of women, above referred to, is most marked. Indeed, in the Panjab and in Agra, the number of females has actually decreased whilst that of males has either risen, or at least held its own. The result is a fall from 858 to 817 women per 1,000 men in the former, and from 931 to 908 in the latter. There being no mention of Suffragettic operations in the proceedings, it can only be surmised that, in contradistinction to experience in famine, women succumb sooner than men to plague and to malarial fever of the kind which raged in these tracts in 1908. We may wait with confidence for the elucidation of these questions at the hands of Mr. Gait, the Census Commissioner, a Fellow of this Society, whose experience, and we may fairly add, whose appreciation, of census work in India is unrivalled. Twenty years ago he superintended the census of Assam; ten year later, that of Bengal, in addition to carrying through the statistical analysis of the returns for all India. In the interval he has been engaged at times in ethnological investigation, a qualification of no mean importance in dealing with the subject of caste and race in the census reports. He is entitled, therefore, to our best wishes for the continued success of the efforts which have given us so valuable and interesting an instalment of census lore.

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[1] I have since been informed by the Census Commissioner that the slips were completed in fourteen days for the Punjab, and in four or five other Provinces in a little over that time.—J.A.B.

II.—*Estimates of Population.* By E. C. SNOW, M.A., *Biometric Laboratory, University College, London.*

IN the May number of the *Journal* the present writer showed that post-censal estimates of population much closer than those at present reached could be made by the use of multiple correlation formulæ. The desirability of comparing the results obtained by any method of computation with the numbers actually enumerated necessitated that the estimates should be made for the date of the 1901 census. Some time after the paper was read, Dr. Stevenson suggested that it would be a good test of the method to attempt to predict the population for a few districts, and to have the results ready by the time the figures of the recent census were disclosed. Unfortunately the time available was altogether too short to allow of a comprehensive survey being made, and I had to select therefore a particular class of district to deal with. I decided to make the attempt on (*a*) the districts of the outer ring of London, and (*b*) districts in other parts of the country, the figures of births and deaths for which indicated considerable increase of population since 1901. These were chosen because it is in such districts that accurate knowledge of the population is particularly desired, and also because the estimates made by those methods which depend upon the hypothesis of uniform rate of increase are, in the case of expanding districts, frequently very far from the actual populations as enumerated at a census.

The type of locality dealt with should be borne in mind when comparing the results by the various methods given in the table. It is the most difficult class of district with which the statistician has to deal, and the figures shown do not give an adequate idea of what any one of the methods is capable of when applied to every district in the country. That the present official method does in many cases give good estimates was brought out by the distribution of errors given in the paper previously referred to (p. 579). It is misleading, therefore, to suppose that the figures given in this note represent the true relative merits of the methods. If the whole of the country were considered, the Registrar-General's methods would appear in a much less unfavourable light.

As in future the unit for statistical purposes in England and Wales is to be the administrative area, and not the registration district as heretofore, and as the figures of marriages are not (at present) readily obtained for the former, Dr. Stevenson expressed the opinion that the figures of births and deaths only should be used in the present attempt at prediction. At first it was intended to use the administrative areas shown in the various annual summaries of the Registrar-General, but the data for many of these were not prepared in suitable form over a sufficient period, and the attempt had to be made, therefore, on registration districts and subdistricts. The method can be applied just as well to the one type of area as the other, but in the hurried circumstances under which the work was entered upon, the data which were immediately available had to be employed.

For the group (*a*) two formulæ were worked out, (1) from the data given by twenty districts, expressing the increase of population from 1891 to 1901 in terms of the excesses of the births and deaths from 1891-1901 over those from 1881-91; (2) from the data of twenty-five districts, expressing the increase of population from 1891 to 1901 in terms of the excesses of the births and deaths from 1896-1901 over those from 1891-96. This was a different arrangement from that adopted in the paper, where the formulæ obtained were based on ten-year periods only, and these used also for the five-year periods with certain modification of the figures (p. 596). I consider the procedure of the present note to be more satisfactory.

The formulæ were then assumed to hold good, *mutatis mutandis*, up to the recent census, and the population was computed by each of them for as many districts as possible, whether included in the group from which the formulæ were obtained or not. The mean of the two results was taken as the estimate. Many districts could not be dealt with, owing to appreciable alterations of boundaries.

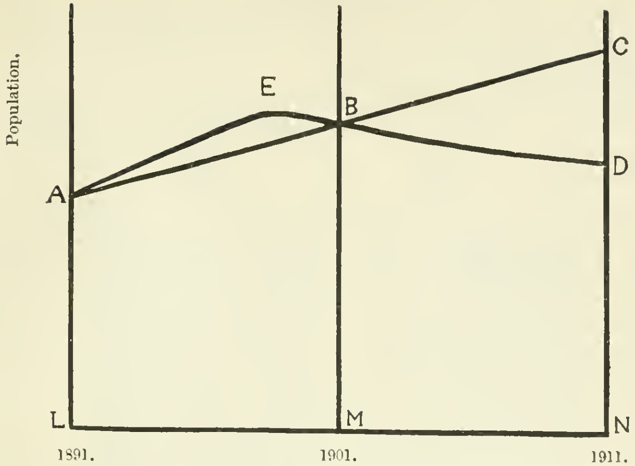
Similarly, formulæ were found for (*b*) both by five-year and by ten-year periods. In this case, however, the districts were also divided as follows: For the ten-year period they were separated into (1) those in which the excess of births from 1891-1901 over 1881-91 was greater than 3,000, and (2) those for which the corresponding figure was between 1,000 and 3,000. For the five-year period the division made was, (1′) excess of births 1896-1901 over 1891-96 greater than 1,000, (2′) the same between 500 and 1,000. It was found that the formula for *b*(2) did not differ much from that for *b*(1), and the latter was therefore employed for all the districts. For the same reason *b*(1′) was used for all districts.

To find the localities which were considered likely to have expanded since 1901, the figures of births given in the Annual Reports of the Registrar-General for 1901 and 1909 were compared. Those districts for which the figure in the latter year was appreciably greater than that in the former and in which no alteration of boundary was evident were taken, and the figures for the intervening years tabulated. The formulæ *b*(1) and *b*(1′) were then applied to these, whether they had been included for purposes of obtaining the formulæ or not, and the increase of population worked out as before. The final estimates are given in the table, together with those by the Registrar-General's old and new methods (pp. 578 and 580), kindly supplied by Dr. Stevenson. The roughness of the work does not warrant the estimates by the method of this note being given with any appearance of exactness, and they are therefore shown to the nearest thousand. The root mean square of the percentage errors (p. 589) has been worked out very roughly for the estimates given by the correlation formulæ and by the Registrar-General's old method, and are 9 and 30 respectively. The latter figure is considerably weighted by one particularly bad estimate—that for Rock Bedwellty—in which the present official method is 167 per cent. in error. Had this district been omitted, the root mean square error would have been 21 per cent., instead of 30 per cent. In the districts of Mitcham and Sedgefield the errors by the official method were 69 per cent. and 49 per cent. respectively. Altogether, in 11 out of the 57 districts, the error exceeded 25 per cent.

The largest error by the method of correlation was that for Hendon (25 per cent.). In the manuscript sent to Dr. Stevenson I stated that the prediction made for this district (as well as for some others of the "outer ring") was a very tentative one. The figures of the deaths were altogether anomalous, for while the births in 1906-10 exceeded those in 1901-06 by 443, the deaths in the former period were 292 less than those in the latter. In fact the deaths in 1910 were no more than in 1892 though the population had increased from 16,000 to 39,000. No doubt the figures used would have been modified had time permitted a close examination of the numbers of deaths in institutions, and the estimate cannot, therefore, be considered a fair example of the method. Apart from Hendon, only four districts showed errors exceeding 15 per cent., viz.: Mitcham (17 per cent.), Brentford (18 per cent.), Harrow (17 per cent.), and Wallasey (15 per cent.). It is very probable that a closer scrutiny of the figures of institutional deaths would lead to improvement in these estimates.

An obvious conclusion to be drawn from the table is that the predictions made by the method of correlation are in the large majority of cases smaller than the enumerated populations. This could be expected from the fact that the birth and death rates were known to be falling, on the whole, throughout the period, so that the same excesses of births and deaths in the latest decade would not imply such a large increase of population as in the earlier one. Allowance could easily be made for this, the estimates being improved thereby.

The results of the recent census suggest that the hypothesis of uniform rate of increase of population is less true in the present century than it was in the last, and that methods based upon that hypothesis are consequently becoming less reliable. The real difficulty is to determine when a change in the rate of growth takes place. The official method assumes that the alteration synchronises with the census. However, in the case of the County of London, for example, there is evidence that the rate of increase steadily diminished from the census of 1891 up to 1896 or 1897, and has since been negative. On this view the population of London was a maximum about 1897. But since the census of 1901 showed an excess of 320,000 upon that of 1891, this was assumed to have occurred uniformly and the result has been that the estimate for 1911 was more than 350,000 too large. These circumstances can be well exhibited in a figure. If the population in 1891 is represented by AL and in 1901 by BM, the uniform rate of increase method assumes that the course of the population is given by the curve ABC, which differs very little from a straight line. This leads to the estimation, CN, for the population in 1911. But if the actual rate of growth in the first decennium is really represented by



AEB, it is the portion EB which should most reasonably be produced to give the number for 1911. CD in this way gives the error at the end of 10 years, while there is a proportional error for the intervening years. By ascertaining if the rate of increase from 1901 to 1911 has been uniform or has reached a maximum and then diminished, it is possible in some cases already to see if the official method is likely, in the absence of great changes, to give good results for 1921. In the cases of two districts—Walthamstow and East Ham—the figures for which have been looked into, it seems probable, unless big changes occur, that the constant rate of increase method will considerably overestimate these districts in 1921, as it has done in 1911.

In the criticisms of this new method there has been a tendency to emphasize the fact that it avails itself of local data, and should, therefore, be expected to give better results than methods which do not use such information. This is true, but misleading. For it implies that the use of local information is troublesome, and that the better estimates are a small return for much extra trouble. But the advantage which is claimed for this method is that it enables the information at present obtained from the locality to be used without any extra trouble of collecting. No special knowledge of the districts or additional communication with local authorities is required. The figures of births and deaths tabulated for the Registrar-General are the only data necessary to form a uniform system of estimates for the whole country.

In concluding this note, I must express my hearty thanks to Dr. Stevenson for his suggestion to undertake the work of prediction, for the prompt assistance he has afforded in placing at my disposal the necessary data and in working out the estimates by the other methods, and, finally, for the keen practical interest he has taken in the proposals put forward for improving the estimates of population.

Registration district and sub-district as in 1901.		Enumerated population, 1911.	Estimated population, 1911.		
			Estimate by correlation formulæ.	Registrar-General's estimates, based on 1891 and 1901 enumerations.	
Number.	Name.			Old method.	New method.
25·5	Streatham	132,163	127,000	128,507	131,736
25·6	Wandsworth	92,397	82,000	91,007	92,556
28·3	Lewisham	83,124	80,000	86,659	88,958
38·2	Mitcham	63,218	54,000	37,363	37,764
39·1	Wimbledon	54,876	51,000	58,211	59,457
39·2 and 3	Kingston and Surbiton	69,265	67,000	69,239	69,805
39·4	Esher	19,018	20,000	17,894	17,947
39·5	Hampton	29,478	30,000	29,001	29,293
125	Uxbridge	60,740	55,000	48,029	48,494
126·1	Isleworth	43,316	47,000	36,147	36,313
126·2	Twickenham	29,374	30,000	26,263	26,558
126·3	Brentford	77,819	66,000	59,453	60,038
127·1	Harrow	49,020	42,000	35,751	36,523
127·4	Hendon	38,806	31,000	29,402	29,860
128·3	Finchley	54,350	49,000	42,058	42,521
129·4	Enfield	56,344	53,000	54,581	55,302
176	Luton	67,537	62,000	58,873	59,033
186·2	Plaistow	105,024	100,000	125,284	127,810
186·3	Canning Town	82,261	80,000	87,716	88,627
186·5	East Ham	133,504	140,000	161,207	167,008
186·7 and 8	Leyton*	124,736	130,000	136,319	139,070
186·9	Walthamstow	143,094	140,000	162,396	166,755
189·2	Ilford	78,205	70,000	72,417	75,252
189·3	Barking Town	31,302	30,000	29,135	29,674
262	Poole	45,191	40,000	39,305	39,634
373·1	Handsworth	71,021	66,000	76,369	77,928
387·3	Erdington	74,536	70,000	65,040	66,881
390	Nuneaton	41,426	40,000	38,318	39,053
394	Solihull	77,933	70,000	68,109	69,581
425	Glanford Brigg	56,206	52,000	49,169	49,063
428	Worksop	56,609	54,000	48,066	48,505
429	Mansfield	125,274	118,000	109,169	111,080
452·3	Wallasey	78,514	68,000	74,808	76,403
463	Barton-upon-Irwell	142,635	125,000	137,693	138,665
504	Pontefract	85,238	80,000	84,902	85,564
505	Hemsworth	40,118	40,000	32,509	33,190
506	Barnsley	141,957	128,000	132,949	133,559

* An attempt was made to estimate for these sub-districts—North Leyton and South Leyton—separately. The institution of an infirmary in the former, however, caused the figures of the deaths in both districts to alter greatly, and so they were clubbed together. But some indication of the course of the population was obtained from the figures of the births, and in my original note to Dr. Stevenson I wrote, "The increase here (*i.e.* from the population of 98,912 enumerated in 1901) is almost solely in North Leyton. South Leyton has increased little, if any." As the latter had expanded by 12,000 in the previous decennium, the official method would have computed a rather larger increase from 1901 to 1911. Actually a decrease of 519 was shown.

Registration district and sub-district as in 1901.		Enumerated population, 1911.	Estimated population, 1911.		
			Estimate by correlation formulæ.	Registrar-General's estimates, based on 1891 and 1901 enumerations.	
Number.	Name.			Old method.	New method.
511	Doncaster	121,523	110,000	105,421	106,657
533	Guisborough	52,827	53,000	47,411	47,271
542	Darlington	68,783	66,000	63,654	63,720
543*b*	Sedgefield	35,401	33,000	23,780	23,741
545	Auckland	106,352	103,000	101,276	100,760
555·4	Winlaton	44,099	45,000	38,044	38,733
557·1	Wallsend	40,737	42,000	42,097	42,909
557·4	Longbenton	34,352	33,000	31,972	32,169
558	Castle Ward	44,568	43,000	40,924	41,426
562	Morpeth	78,050	72,000	69,756	70,541
583·1	Aberystruth	51,671	50,000	48,615	49,410
583·2	Tredegar	57,022	55,000	46,581	46,666
583·3	Rock Bedwellty	13,626	15,000	5,101	5,145
587·3	Llantrisant	50,935	46,000	40,268	40,479
587·4	Ystradyfodwg	120,790	110,000	110,513	111,676
588·1	Gelligaer	35,521	34,000	21,988	22,276
589	Bridgend	94,620	90,000	84,445	85,398
590	Neath	100,942	92,000	87,564	88,350
591	Pontardawe	41,979	38,000	32,113	32,346
594	Llanelly	74,020	65,000	62,301	62,137

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Report of an inquiry by the Board of Trade into working class rents, housing and retail prices, together with the rates of wages in certain occupations in the principal industrial towns of the United States of America.* [Cd-5609.] 1911. Price 5*s.* 1*d.*

In their American inquiry, the Board of Trade Statistical Department have entered a fresh field of investigation in more than one sense. Not only have their investigators crossed the Atlantic to secure data in another country; they have also dealt with conditions differing fundamentally from those which were found in the European countries upon which separate reports have already been issued. Twenty-eight towns were covered by the inquiry, all situated between the Atlantic sea-board and the Mississippi.

The work done by individual investigators, in America as in Europe, is admirable; and we should strongly recommend all who can spare the time to delve in the reports on individual towns, where the investigator is face to face with actual facts, before attempting to follow the general editor in his most difficult task of drawing conclusions more or less applicable to the results as a whole. Hidden away in the pages of these town reports will be found many an enlightening fact of more than statistical interest. In New York City, for instance, the birth-rate for foreign-born mothers is three or four times that for native-born mothers. What presage may there not be in this for the future of the mighty republic, when it ceases to attract immigrants at the rate of the last twelve years? In striking contrast is a table giving the percentages of increase of population for each borough in the city at decennial intervals for a period of forty years. These borough percentages range from 18·1 to 125·5, while the city as a whole shows a steady growth in each decennium. Let us put the figures side by side with those for greater London:—

New York City.				Greater London.			
Year.	Population.	Decennial increase.	Per cent.	Year.	Population.	Decennial increase.	Per cent.
1870	1,478,103	—	—	1871....	3,885,641	—	—
'80...	1,911,698	433,595	29·3	'81 ...	4,766,661	881,020	22·7
'90....	2,507,414	595,716	31·2	'91 ..	5,633,806	867,145	18·2
1900....	3,437,202	929,788	37·1	1901...	6,581,402	947,596	16·8
'10....	4,766,883	1,329,681	38·7	'11....	7,252,963	671,561	10·2

Of course the actual figures need much qualification before a comparison can be attempted. Apart from the difference in age, New York City has an area of only 327 square miles against Greater London's 700. The figures of the latter show a more natural and steady growth, albeit retarded somewhat in the last decade; but the effect of a constant stream of immigration is plainly shown by the rising *percentages* of increase in New York. Evidently the port of entry takes a large share of the immigrants, for even Chicago shows a declining rate of increase since 1880.

In the report on Fall River, the largest cotton manufacturing city in the United States, it is stated that the wages in that industry are revised every six months according to the margin between the average price of middling upland cotton and the selling price of a certain quality of print cloth. The agreement to this effect between masters and men is, however, of very recent date. It provides a scale of wage-rates corresponding to the margin above stated. In most respects America shows itself to be a land of variety. In the midst of schedules of high prices for commodities it is refreshing to find that the citizens of Cincinnati only pay fifteenpence per thousand cubic feet for their gas. They have discovered a natural gas and in consequence have ceased to manufacture coal gas. On the other hand, in Duluth, a comparatively small town of 78,000 inhabitants, bricklayers' wages are higher than in New York or Boston. This is probably due to the fact that, owing to special winter conditions, building operations are practically limited to eight months in the year. The Philadelphia report contains a curious account of the supersession of the old-fashioned "corner" store by the "multiple" cash stores, run on "no credit" and "free delivery" lines.

Although the American population contains a great variety of nationalities, its race question is practically centred in the negro. Of other races, one succeeds another without friction, as in the North End of Boston, where the Italians have almost entirely supplanted an Irish colony. But, after a generation, the tendency to draw into the common white stock usually asserts itself. With the coloured population, however, the reverse is the case. They have churches, schools, newspapers, doctors, lawyers, clubs, societies and amusements exclusively their own in several cities, and the Baltimore report speaks of this as a tendency towards the formation of a community within a community.

In the table of wages index numbers, New York is by no means *facile princeps*, as will be seen in the following extract therefrom, relating to the largest towns. New York is taken as the standard throughout:—

Wages Index Numbers.

Town.	Building.		Engineering.		Printing.
	Skilled.	Unskilled.	Skilled.	Unskilled.	Hand compositors.
New York	100	100	100	100	100
Boston	91	77	81	102	90
Baltimore	87	86*	83	86	80
Philadelphia	86	87*	85	92	86
Cleveland	96	73	86	97	93
Pittsburg	98	102	95	90	90
Chicago	110	93	100	108	100
Minneapolis	97	74	88	109	89

* Wages of negroes.

It is difficult to reconcile the low index number for unskilled men in the building trades in Minneapolis with the exceptionally high one for unskilled men in the engineering trades in the same town; and no reason for the discrepancy is suggested in the report. But large numbers of immigrants appear to be employed on mechanical work in the sash and door factories, and presumably these men are paid wages below the normal. In Chicago, it will be noticed, the mean level of wages is distinctly above that of New York. The usual number of hours of labour per week is from 44 to 48 in the building trades, 54 to 60 in the engineering trades, and 48 among hand compositors on job work.

The rent statistics have been obtained by the method already explained in connection with the European inquiries, the results being, therefore, reliable in proportion to the experience and industry of each investigator. But the range of the predominant rents for the same number of rooms is unusually wide; and we cannot help thinking that this must be due to the difference in cost between brick houses and timber or "frame" houses. The latter, it may be said, are much the more numerous. Even in a comparatively old town like Boston, we are told, three-fourths of the buildings of every kind are of wooden construction: and, presumably, the proportion is higher in towns of more recent growth. It seems to be assumed that what is called a "general equivalence of rentals as between brick and frame houses" exists; but we find no direct evidence in support of this assumption. The following compilation from two of the rent tables will speak for itself:—

Predominant weekly rents of working-class dwellings.

Town.	Two rooms.	Three rooms.	Four rooms.	Five rooms.	Six rooms.
New York	—	9/7 to 13/6	12/6 to 16/4	15/5 to 21/2	—
Chicago	—	5/9 „ 7/8	6/9 „ 11/6	11/6 „ 15/5	15/5 to 21/2
Boston	6/9 to 8/8	7/8 „ 10/7	9/7 „ 13/6	13/6 „ 16/4	15/5 „ 22/1
Cincinnati	5/9 „ 7/8	9/7 „ 11/6	11/6 „ 15/5	—	—
Cleveland	—	5/9 „ 7/8	7/8 „ 9/7	9/7 to 14/5	14/5 to 15/5
Milwaukee	—	—	6/9 „ 11/6	9/7 „ 14/5	12/6 „ 17/4
Minneapolis—					
Old dwellings	—	5/9 to 7/8	7/8 „ 9/7	9/7 „ 12/6	11/6 „ 17/4
Modern dwellings	—	8/8 „ 10/7	11/6 „ 15/5	14/5 „ 19/3	19/3 „ 21/8
Philadelphia	—	7/8 „ 11/6	9/7 „ 14/5	10/7 „ 17/4	13/6 „ 17/4
Pittsburg	6/9 to 8/8	8/8 „ 12/6	11/6 „ 17/4	14/5 „ 19/3	17/4 „ 21/2
Mean of all towns except Duluth (excluding coloured tenants)	—	6/9 to 9/7	8/8 to 12/-	11/6 to 14/11	13/- to 17/4

We have placed Chicago next to New York in this table in order to emphasize the remarkable comparison between the two—all the more remarkable because Chicago, where wages are slightly the higher, has a much lower rent standard. The most probable explanation of the latter is the lower site values as compared with New York.

The rentals of over 90,000 dwellings were ascertained in the course of the inquiry. The wide range between the minima and maxima of the predominant rents will at once be apparent, five-roomed houses in Philadelphia furnishing the most striking example. The mean rent of each size of dwelling given in the last line of the table has been divided by the number of rooms and a figure deduced called the "average rent per room," viz., 2*s.* 7½*d.* per week. This has apparently been done in order to compare with the average rent per room (2*s.* 7¾*d.*) paid by families who furnished budgets of expenditure. It is much to be regretted that the term "average" should be applied to a mean rent arrived at without regard to the number of dwellings let at each individual rent. This, however, is only a small blemish, and it must be admitted that the coincidence furnished a great temptation to depart from rigid statistical methods. Throughout this series of investigations the system of taking mean rents instead of true averages has been a drawback.

In addition to the series of family budgets to which we have become accustomed, 17,000 quotations were obtained for food prices. In order to arrive at index numbers, these prices have been applied to the following quantities to represent the average weekly consumption of a typical working class family:—

Tea	⅓ lb.	Flour, wheaten	10¼ lbs.
Coffee	1 ,,	Bread, white	8¼ ,,
Sugar	5¼ lbs.	Milk	5⅓ qts.
Bacon	1¾ ,,	Beef	6¾ lbs.
Eggs	22	Mutton or lamb	1¼ ,,
Cheese	½ lb.	Veal	¾ lb.
Butter	2 lbs.	Pork	2¼ lbs.
Potatoes	21 ,,		

These form a most interesting comparison with the corresponding quantities for the United Kingdom, Germany and France, which will be found on p. 210 of the *Journal* for March, 1908, on p. 529 of the issue for September, 1908, and on p. 116 of that for March, 1909. The index numbers deduced for the largest towns are quoted in descending order :—

Boston	105	Philadelphia	96
Pittsburg	102	Minneapolis	95
New York	100	Chicago	94
Cleveland	99	Milwaukee	93
Baltimore	97	Cincinnati	92

In this respect, also, Chicago has the advantage of New York.

It is very interesting to notice the changes in the above order produced by using index numbers to denote the combined effect of rents and food prices. The list is again given in descending order :—

New York	100	Minneapolis	91
Pittsburg	100	Cleveland	90
Boston	99	Chicago	88
Cincinnati	92	Baltimore	86
Philadelphia	92	Milwaukee	86

In the usual attempt to arrive at what is called the "approximate relative level of real wages," New York is the only town separately treated, the others being grouped in two ways—geographically and by population. We have space only for the former :—

	Number of towns in group.	Mean index numbers.		
		Wages of skilled men in building, engineering, and printing trades.	Rents and food prices combined.	Approximate relative level of real wages.
New York	1	100	100	100
New England towns	6	80	94	85
Other eastern towns	4	87	92	95
Central towns	6	87	90	97
Middle west towns	5	95	91	104
Southern towns	6	88	96	92

It is clear that the favourable conditions indicated as existing in Chicago have been powerful enough to elevate the general standard of the five towns of the Middle West above that of any other group.

We cannot follow the compilers of this remarkable volume in their attempt to compare, on these *data*, working-class conditions in America with those prevailing in the United Kingdom. So many allowances, modifications and qualifications must be made that very little confidence can be placed in the results which emerge. Were the figures for London and New York placed in parallel columns, some instructive conclusions might be indicated; and a similar method might perhaps be adopted with advantage in regard to other individual British and American towns. But any attempt to take means and averages over all the 28 American towns in this report, with their varying conditions of race, climate, trade and civilisation, must fail to produce a satisfactory standard of comparison with similar means and averages for 94 British towns. Take the town wages comparison. It is limited to three industries. American towns contained only 33·1 per cent. of American population in 1900, while British towns contained 71·3 per cent. of British population in 1901. Urban commerce and industries in America, therefore, have enormous opportunities to utilise before they reach conditions at all similar to those of the United Kingdom; and it is but natural that there should be a great demand for labour, and consequently high wages, in American towns. Nor is it likely that this advantage will be entirely offset by the higher scales of rent and food prices in an agricultural country of vast extent, where town houses are mainly of wooden construction.

The attempted comparison is, however, strained against the United Kingdom in two ways—possibly in others. In the rent comparison, dwellings of 3, 4, 5 and 6 rooms only are used, and equal weight is given to each. Yet, in a table on the preceding page, it is clearly shown that the most common sizes of dwellings in England and Wales are 3, 4 and 5 rooms, while in American towns they are 4, 5 and 6 rooms. America has apparently no single-room tenement, and very few of two rooms. Roughly speaking, the American workman has one room more for his family than his English *confrère*, so that the figures ought to have been weighted against him. He has also to pay more for travelling, as there are no workmen's fares, either on railways or tramways, in America. In the matter of date, United Kingdom prices for October, 1905, are compared with American figures for February, 1909; and, although some percentage is afterwards added to the former in order to bring them to the assumed price levels of 1909, the comparison has no certainty, and is already vitiated by the extraordinary increases which have occurred in American food-prices since that date. The Board of Trade officials have placed us under a lasting obligation by their labours on this series of great enquiries; but we think their comparisons should be limited to *data* that are properly comparable. E.J.H.

2.—*The new Dictionary of Statistics.—A complement to the 4th edition of Mulhall's "Dictionary of Statistics."* By Augustus D. Webb, B.Sc. 682 pp. London: George Routledge and Sons, 1911. Price 21*s.* net.

The various editions of Mulhall's "Dictionary of Statistics" were not reviewed in this *Journal*, but the Society contented itself with printing a translation of M. de Foville's extremely witty and satirical article on the first appearance of the work in 1883. It was no doubt felt that it was difficult to regard the book as a serious contribution to statistics. The idea of such a volume was in itself praiseworthy, but the book has long been a byword among statisticians as a monument of useless labour and a guide to be carefully avoided. Its main defects were two: in the first place the author gave no references whatever—on the plea that it would swell the work to undue dimensions; in the second, genuine data, based upon unexceptionable sources, were intermingled with the wildest shots by the author, with the consequence that the reader had not the slightest idea how much reliance could be placed upon any given figure.

The present work is described as a "complement" to the last edition of Mulhall's Dictionary, but this is hardly a correct description. Beyond the fact that the general scheme is arranged upon similar lines, and that the various subjects are comprehensively dealt with in alphabetical order, the author may almost be said to have ignored his predecessor's work. In so doing he has been very wise; and we may perhaps say that the subsidiary title is somewhat unfortunate, as it will most likely create an unwarranted prejudice against the present volume in the minds of those who have ever consulted Mulhall otherwise than in the most perfunctory manner.

Mr. Webb has avoided both the grave defects alluded to above; and has not attempted to give any data for which he cannot quote a weighty authority. He has omitted many headings, such as "aerolites," "amphitheatres" (dimensions of), and the like, which are of no real interest to statisticians; and he has not tried to bring up to date estimates of a very doubtful character, such as those of the amount of "dairy produce" consumed in certain countries, the number of lightning conductors, or the steam-power of nations. He has, accordingly, produced a volume which may with advantage be consulted for succinct information on a mass of subjects; and the reader, who will doubtless not be prepared to accept any statements without more precise qualification, can invariably turn to the original source quoted to ascertain the true meaning of the figures. The work may, in fact, not inaptly be described as a "statistical abstract" on an enlarged scale, in which the articles are arranged alphabetically; and as such it will be a distinctly useful work of reference, or an index to statistics.

A minute examination of such a mass of figures is naturally impossible, and the present reviewer has accordingly selected, as a sample of the whole, a subject with which he is familiar, namely, the statistics of "agriculture and live stock." This section occupies some 37 pages, and like other larger articles, consists of a series of tables of an international character, followed by details for each country separately. International tables are also given for various items under more specific headings, such as "cattle," "barley," &c., in other parts of the work. We have compared some of the tables given with the originals—the British agricultural statistics, the statistical abstracts, the year book and certain bulletins of the United States Department of Agriculture, the agricultural returns of foreign countries, and such like publications being the chief sources. Very few misprints or errors in copying data have been detected: this portion of the work has evidently been well done.

In a work of this comprehensive character, completeness cannot be expected. Indeed, what strikes the student most is the immense amount of labour that has been devoted to the task. To secure that each subject be treated with equal fullness would require a lifetime, and it is with due recognition of this fact that we mention some small points where improvement may be looked for in a future edition. Of course, we recognise also that limits of size must have been imposed upon the author, and that he could not be expected to grope in the highways and byways of statistics for data upon obscure subjects. Though it may, perhaps, be held that the main point of a dictionary is to enable one to ascertain what is *not* obvious and obtainable in well-known works of reference.

The tables of international comparisons might be more complete, and these bear evidence that the author has contented himself with copying handy tables without seeking to fill gaps from other sources. The first table, for instance, under "agriculture," taken from an American source, gives the total area, and area under grain of all European countries, however small, but of European countries only. The next table, from the *Report* in Part IV of the Agricultural Statistics, 1907, gives, for the main colonies and Europe, the total area, cropped area and number of live stock. In both these cases we miss the much more important United States, Argentina, &c. Very little extra trouble would have enabled the author to add similar data for such countries from his own tables in subsequent pages. For cattle a much more useful international table is given on pp. 82 and 83, while the table of live stock (which would hardly be looked for under "Food") would be better in this article than on p. 278. In this connection it may be mentioned that there is a good index, which it is very necessary to consult before assuming that a particular heading comprises all the information given upon a subject.

Some instances of unevenness have been noticed, *e.g.*, why should the relatively unimportant trade in live stock between Ireland and Great Britain, and the United Kingdom's imports and exports of horses, cattle and sheep, be allotted tables (p. 15), while the important beef and mutton trade is not mentioned? [Imports of total meat only, and of bacon, are given on pp. 96 and 97, under the heading "Commerce."] For Canada we find details of the size of agricultural holdings, doubtless by an oversight, for particulars of other countries are given under the heading "Land," where also the Canadian figures are repeated.

Mention may be made also of a difficulty (practically unavoidable) due to giving tables from several sources, viz., that figures for the same item do not always coincide. The differences in the production of wheat for certain countries, on p. 632, are slight (allowance being made for the fact that one set has not been converted from Winchester bushels), but the reader may be puzzled to know which to accept. With inconsistencies in the original data we can hardly expect the compiler of such a work to cope, but it may be pointed out that the figures of live stock in the United States for 1900 and 1908 (p. 35) are totally incomparable. The "shortage" of beef in that country has been so notorious during the past decade as to make it obvious that cattle have not increased from 44 to 71 millions in eight years. The fact, of course, is that the figures of the census office differ entirely from those of the Department of Agriculture; those of the former for 1900 being no less than 67,800,000. Had the author looked a little more closely at the table from which he extracted the data, he could not have failed to see that the number of "other cattle" jumped from his 27,600,000 in 1900 to 45,500,000 in the very next year; a fact which should have caused him to hesitate before reprinting the figures.

A praiseworthy feature is that many of the figures are given to the nearest 1,000 only. The author has also frequently introduced short judicious comments on the comparability of data, such as still-births, which are liable to different definitions in different countries; and has not as a rule confined himself to slavishly copying out tables, but has generally paid proper and intelligent attention to footnotes and the various qualifications that may affect the statistics. He has not always escaped inconsistency: for instance, a table on p. 7 has a footnote correctly stating that the 52 millions given as the number of cattle in India excludes calves; a footnote which is not repeated where the same figure is given on p. 83. R.H.H.

3.—*The purchasing power of money.* By Irving Fisher, assisted by H. G. Brown. xxii + 505 pp., 8vo. New York: The Macmillan Co., 1911. Price 12*s.* 6*d.* net.

The kernel of this book contains the results of a brilliant piece of research, in which, after discussion of the theory of the value of money, an attempt is made to establish the truth of the quantity theory inductively. The equation determining the purchasing power of money is reduced by a careful analysis to $MV + M'V' = PT$. P is the general level of price, T the quantity of exchanging done in a given period, M money in circulation, V its velocity of circulation, M' deposits subject to cheque, and V' its velocity of circulation, so to speak. The equation implies that the degree in which bills of exchange circulate remains a constant proportion approximately of the quantity of exchanging to be done. First, the test of broad price movements throughout the nineteenth century in relation to known events affecting media of exchange is applied, and the conclusion is reached that the correctness of the equation is highly probable. Next, Professor Irving Fisher tries a more rigid test. He essays to calculate for the last fourteen years the value in the United States of each term in the equation, with the object of comparing the value of P derived from the equation with its value as revealed directly by index numbers of general prices.

T is obtained without very great difficulty from a number of indices, namely, foreign trade, internal commerce, sales of stocks, tonnage carried over railways and letters handled. I say without "very great difficulty" in view of the obstacles which had to be surmounted in discovering the value of other terms, though actually the settlement of the quantities of T involved immense work and the exercise of much ingenuity. M was got from various reports and estimates. But how could V be decided upon. On first thoughts it would seem that any given coin may circulate within a year an incalculable number of times. In meditating over the determination of M, Professor Irving Fisher hit upon a brilliant generalisation. It is that M is really given with close accuracy by the payments into and out of banks plus the money wages paid in the course of the year. A few moments' thought, now that it has been pointed out, will show that the generalisation holds broadly. So far as things are bought with cash the money with which they are bought, less the change given, that is money to the value of what is bought, must generally flow into banks under modern conditions, when businesses are large, in order to facilitate account keeping. Expenses of a business, say a shop, are paid usually by cheque or with cash drawn from the bank for the purpose. Then the stream of coins flowing continuously into the shop must clearly pour finally into a bank. So, generally, every time a coin effects an exchange, apart from paying a wage, it returns to the bank to report itself, so to say, before effecting another. Many small shops are an exception to the rule, but the magnitude of their trade is small in comparison with that of the larger shops. Now consider what happens when a coin is used to pay a wage. After paying the wage it does not go at once to a bank. But it does usually go to a bank as soon as the person who received it spends it. So payments into and out of banks plus the aggregate of money wages paid approximately yield V. Coming to M' and V' we find the fundamental idea underlying their determination is the notion that cheques do not usually, or in a changeable degree, circulate. Hence $M'V'$ may be derived from cheque clearings as a barometer, given certain other information, which our author managed to elicit. Into the minutiæ of the calculation I must not enter.

By the time the values of all the terms have been approximately fixed, the reader will find that he has been worked up to a pitch of excitement about the final test. Here are the figures for P as calculated from the formula and as given by index numbers of general prices:—

	Index number of P.	$\frac{MV + M'V'}{T}$		Index number of P.	$\frac{MV + M'V'}{T}$
1896........	63	54	1903	87	75
'97........	64	52	'04........	85	81
'98........	66	56	'05	91	83
'99........	74	69	'06.......	97	90
1900........	80	68	'07........	97	86
'01........	84	76	'08.......	92	87
'02........	89	82	'09........	100	100

Out of 12 inflections in each of the curves expressed by these figures there are 6 agreements, 3 disagreements, and 3 neutral. The "correlation coefficient" is 97 per cent. of perfection, but obviously, in a case of this kind, the coefficient of correlation is apt to be misleading. The correlation coefficient of the successive year-to-year ratios of the figures is ·57, with a probable error of ·1. It is of importance to notice that the coefficient of correlation of the second kind, between M and index numbers of P, is ·43, with a probable error of ·13. Readers will judge for themselves whether Professor Irving Fisher is justified or not when he says that "the most exacting of critics could not ask for any greater consistency of results and conformity to the theory of the equation of exchange than these statistics show."

Incidentally, most important results are reached as regards the ratios of M to M′, V to V′, and MV to M′V′, all of which previously figured among the unsettled questions of political economy. Bimetallism, polymetallism, symmetallism, and the system of the limping standard, are handled in their appropriate places in Professor Irving Fisher's masterly fashion. The book concludes with an illuminating discussion of the question whether purchasing power can be made more stable. Our author thinks "that it may well be asked whether those who devised the gold-exchange standard did not build better than they knew."

In the opinion of the reviewer, this book is a magnificent achievement. It definitely brings a certain part of political economy on to the plane of the quantitative sciences. But some credit must be accorded, and is by our author accorded without stint, to the pioneer work of Professor Kemmerer in the same field. The research of which a brief account has been given in this notice will add greatly to the renown which its author has already fully earned by his two volumes on "Capital" and "Interest" respectively, and by his report to the American Senate on the conservation of vital forces. S.J.C.

4.—*State Socialism in New Zealand.* By James Edward Le Rossignol and William Downie Stewart. ix + 311 pp., crown 8vo. London: George G. Harrap and Co., 1911. Price 5s. net.

Different accounts have appeared previously, either dealing with some particular phase, such as compulsory arbitration, of the various experiments in State Socialism recently tried in Australasia, or furnishing such a general conspectus of the broad policy as one consistent whole as that supplied for example by Mr. Pember Reeves. But we do not know of any former attempt, conceived or executed, from the special aspect, or along the definite lines, of the present book. Its joint-authors avow in their Preface that they have kept in view throughout their work the point of view, both of the "foreign observer," and also of the "citizen of the Dominion" who takes an active part in the study and discussion of the public affairs of his community. A Professor of Economics from the University of Denver and a Barrister living at Dunedin are, it will be obvious, fitted by their respective training and domiciles to combine the qualifications needed for the successful conduct of the useful survey which is here attempted. They have indeed produced an adequate and yet compendious treatise which will, we think, be found at once judicial and informing. If they possess a bias, it has not prevented them from linking candid criticism of defects or errors with a cordial recognition of the gains achieved and a frank admission of the difficulties encountered; and the happy marriage of the detached observations of a foreign expert, who is frequently bringing into contrast the experience of his own United States, to the intimate acquaintance with the actual facts possessed alone by a citizen of the country which is being investigated, could hardly fail to result in the agreeable and opportune conveyance to English readers of much interesting instruction.

It is true, although it has sometimes been forgotten, that we cannot safely argue from what was attended by a tolerable measure of success under favouring conditions in the fresh microcosm of a comparatively new community to what could be securely, or would be profitably, introduced into the older, larger and more complex world of the United Kingdom; and this proviso is perhaps particularly applicable to experiments, which have prominent notice in this book, like the compulsory arbitration of industrial disputes, or the taxation of the unimproved value of land. Our authors moreover plainly show, with a discrimination characteristic of their handling of their subject, that the actual evidence forthcoming from New Zealand itself is not wholly favourable to either of these two expedients, which have nevertheless been lately recommended to the people of this country. They would certainly qualify the confident hopes of the Minister we have mentioned, who was responsible, before he settled in Great Britain, for the introduction of the former scheme; and they would also supplement the official account of the latter fiscal measure furnished on the occasion of the contemplated adoption of a similar principle in an English Budget with some modifying commentary or adverse criticism of their own. Yet useful hints, whether of warning or of suggestion, for British statesmen and an old-world public may be gathered from the cool, fair and clear discussion in the successive chapters of this book of such live topics as those to which we have alluded, as well as other subjects like railway finance, State life and fire insurance, and old age pensions. The writers seem to have sought, at first hand, authority for the facts which they adduce; and the figures which they bring forward are mostly drawn from official sources. They have tried conscientiously to state "the truth, the whole truth, and nothing but the truth"; and we believe that they have achieved their very laudable aim of showing the "workings of the various social experiments as they are without exaggeration or concealment." Nor would any sincere intelligent social reformer question their pertinent declaration that "it is not enough to make a law and create a Government department," but that, on the contrary, the nation responsible for the enactment should watch jealously its subsequent administration, and note with scrupulous care all its effects, direct or indirect, for good or for ill.

We do not know whether the authors of this book are right or wrong in their opinion that at the present moment the inclination of the public of New Zealand, and the feelings and plans of their prominent statesmen, are away from rather than towards any further increase of State Socialism. To an external critic indeed the ominous announcement that one-eighth of the people of the country are now directly dependent on the State would seem to show that the advance achieved already in that direction had been very marked. From this book too it is plain that the State railways are worked at a deficit, which, properly calculated, is not inconsiderable, that the bestowal of State pensions on the aged poor has not failed to illustrate the fatal ease with which salutary restrictions originally imposed for reasons of expense may subsequently under popular pressure be relaxed, and that State arbitration has certainly not succeeded fully in realising its avowed object of guaranteeing "industrial peace." But, on the other hand, we are assured that, if the public debt be large, the money raised along this line of least resistance has been used to a great extent for profitable productive enterprise, and that, if promotion by seniority in the public service has resulted in some inefficiency, New Zealand is comparatively immune from the worst evils of that "spoils" system which stains American democracy. As a whole the picture drawn has lights as well as shadows; and it leaves no doubt upon our mind of the pure motives and the transparent honesty of those responsible for its draftmanship and colouring. They have, we think, furnished an illuminating study of the remarkable series of instructive experiments in socialistic legislation, for which New Zealand has become conspicuous, together with that Australian Commonwealth, which is its nearest neighbour. L.L.P.

5.—*Le situation économique et financière de l'Égypte. Le Soudan Égyptien.* Par Pierre Arminjon, professeur à l'École Khédiviale de Droit. xii + 708 pp., 2 maps and charts, 8vo. Paris: Librairie générale de Droit et de Jurisprudence, 1911. Price 18 frs.

Professor Arminjon has set himself to furnish a comprehensive survey of the economic history, conditions, problems and prospects of Egypt and the Egyptian Soudan. After a brief sketch of its history with special reference to trade and commerce, especially in the nineteenth century, he proceeds to survey the geographical conditions affecting its development (soil, climate, irrigation, means of communication); its industries and agriculture; its foreign commerce; its currency system and banking institutions (including an examination of recent financial crises), and proposals for reform therein; and the public finances. A short account of the dependencies of Egypt, including the Egyptian Soudan, follows, and the remainder of the book is devoted (pp. 589—664) to a consideration of the lessons of the 1907 crisis and a plea for certain reforms. Pages 665—708 are occupied by some appendices and statistical tables.

The book suffers to some extent from the wide range of subjects which Professor Arminjon has endeavoured to cover; it is too detailed in some places and excessively abbreviated in others; there is some amount of unnecessary repetition, probably due to the fact that portions of the book have appeared as magazine articles at different dates; and there is an occasional tendency to dwell upon the obvious. Further, Professor Arminjon might with reason complain of the treatment accorded to him by his publisher and printer. The former has produced the book in an intolerable form—it breaks in pieces immediately one commences reading; whilst the latter has committed a number of vagaries (notably in the table on p. 166). The absence of an index is also lamentable.

Nevertheless the book thoroughly deserves careful reading, if only as an interesting study of a State which is, from the economic point of view, almost unique. The author's standpoint is that of a sympathetic critic; he appreciates to the full the remarkable work which has been wrought in Egypt since 1882, and he pays a high tribute to the progress realised in the Egyptian Soudan during the last decade; but he is clearly beset by an uneasy conviction that the economic foundations of Egypt's prosperity are far from being sound, and the case which he presents undoubtedly needs very careful consideration. In proportion to its utilisable area Egypt is a very densely populated country; it is dependent almost solely upon its foreign trade for many of the commodities which modern communities regard as essential; it is heavily in debt to foreign countries; and for the maintenance of its population, the supply of many of its needs, and the discharge of its foreign obligations it relies almost solely upon cotton. Compared with that article its other exports, whether of other agricultural products or of manufactured goods, are insignificant, and a marked fall in the price of cotton, whether due to an increase of the world's output outpacing the growth of demand or to a decline in the quantity or quality of Egypt's product, would mean a grave economic crisis. Hence the anxiety caused by recent untoward occurrences in connection with the Egyptian cotton crop, a matter which called for and is receiving the serious attention of the Egyptian Government; and hence, also, Professor Arminjon's proposals for efforts to widen Egypt's economic basis by increasing the range of agricultural production. He recognises that the establishment of order and regular administration; the reorganisation of the finances; the development of irrigation and means of communication, were the primary tasks of government after 1882, and that administrative energy had to be concentrated upon them; but he urges that the time has now come when attention should be directed mainly towards the development of productive powers. He advocates, therefore, the enlargement of the staff and functions of the new Department of Agriculture; the provision of travelling instructors; the establishment of model farms; the organisation of the rural population into co-operative societies upon the lines successfully adopted in Algeria; the reorganisation and extension of credit banks; the provision of technical and industrial education; and a number of miscellaneous reforms connected with currency and commercial legislation. Professor Arminjon certainly makes out a strong *primâ-facie* case in support of his proposals, and we may hope that some at least of them may be actively taken up by the Egyptian Government at an early date. P.A.

6.—*Die Entwicklung der kommunalen Schulden in Deutschland.* Einleitung und Abschnitt I bis Abschnitt III. Von Johannes Pfitzner. iv + 88 pp., and charts, 8vo. Leipzig, 1911.

This pamphlet (privately printed) is the first part of a work which has recently gained for its author the Doctorate of the University of Berlin. The whole work is intended to be an inquiry into the nature and growth of local indebtedness in Germany, the causes of its very rapid increase in recent years, the forms which it takes, and its effect upon the money market. The first part now before us is almost purely statistical; it is devoted to a detailed (perhaps on the whole too detailed) statement and examination of such data as are available. And here we must confess to feeling that glow of satisfaction which recurs whenever we have occasion to examine the official statistics of German local finance. Those statistics are as a matter of fact very incomplete, and data for a long series of years are obtainable only in rare instances. Thus as regards Dr. Pfitzner's special subject, comprehensive official statistics of communal indebtedness in Prussia appear to be available only for the years 1849, 1876 and 1906; and even in this latest instance they relate only to towns and to rural communes with more than 10,000 inhabitants. Baden has the distinction of having published such data regularly since 1881; but in general German local government statistics show much room for improvement, and no State of the Empire has anything comparable to the productions of our own Local Government Board.

In spite of imperfect materials Dr. Pfitzner has produced some very interesting results, though his attempts at a comparison of the national and municipal indebtedness of Germany, France, England and Japan (why Japan?) are not very convincing. The general features of the development in Germany, notably during the last three quinquennia, are similar to those of which so much was heard in England a few years ago; there has been the same marked advance in the standard of municipal administration, the same inter-municipal rivalry (conscious or unconscious), the same swift extension of the sphere of municipal action, and the same rapid accumulation of debt. Dr. Pfitzner's conclusions, so far as they can be judged from somewhat scattered and scanty indications, would appear to be that the larger towns have shown an undue inclination to follow the Imperial policy of *Schuldenwirtschaft*—that is, to meet an undue proportion of expenditure out of loans, and have thereby overburdened the money market and hampered German industry; whilst on the other hand the smaller towns and communes have been checked and their desirable development has been restricted by their inability to borrow sufficiently, owing to their lack of market credit and the apparent non-existence of any machinery corresponding to the English Public Works Loan Board. We shall look forward with much interest to the completion of Dr. Pfitzner's work, and in the meantime we can recommend this first instalment as a statistical study of great interest. P.A.

7.—*Le Mouvement Physiocratique en France de* 1756 *à* 1770. Par Georges Weulersse. Tome Premier, xxxiv + 617 pp. Tome Second, 768 pp., 8vo. Paris: Felix Alcan, 1910. Price 25 francs.

In these two large volumes, containing together more than 1,400 pages, a worthy monument has been raised by the indefatigable zeal of their competent and learned author to the enduring memory of that distinguished band of French writers and thinkers who flourished about a century and a half ago and gained for themselves the significant distinction of being styled *par excellence* "the Economists." But, curiously enough, the Physiocrats have hitherto, as Professor Weulersse informs us in his Preface, shared the fate proverbially attending many prophets and instructors. They have received elsewhere more honour than in their native land. This has been apparently their destiny in the sense at least that no such comprehensive study of their careers, and no such adequate and indeed complete account of the various products of their active pens, has been forthcoming in their own language during the long interval that has now elapsed since the time when their doctrines were the acknowledged vogue in French educated circles, and their high repute was spread throughout the cultivated world of European thought. Dr. Weulersse, we may add, does not propose to halt for long at the *terminus ad quem* of 1770, to which he has brought his present narrative down. He hopes and intends to describe in a sequel, for which he has already collected the necessary material and prepared the outlined plan, the last days of the school, when they regained a temporary favour, with the accession to administrative power of the famous Turgot who is described by our present author, as by others, as the illustrious "half-disciple" of Quesnay, or of Gournay. Nevertheless, in the two volumes now before us he has, we think, removed finally from his compatriots the "reproach" to which he draws attention; and for reasons that he adduces 1770 is a convenient stopping-place. We have no doubt that this admirable and exhaustive treatise will take and keep its position as the authoritative record and the final thorough and discriminating analysis of the Physiocratic movement.

The writer, it is evident, has spared no pains to equip himself for the execution of his enterprise; and, as a result, he has achieved the success which he has so amply earned. Not content with studying page by page, paragraph by paragraph, and sentence by sentence, the literary output of the Physiocrats themselves, he has diligently inquired into their origins and their antecedents; and he has followed and set forth the successive stages of their intellectual influence, from its early genesis to its full fruition, and again from the culmination of its sway to its decadence and overthrow. In the true historical spirit he has sought to place the subjects of his treatment amid their actual surroundings in the France of their day. No less liberally comprehensive has been the purpose which has prompted him to demonstrate the necessary connection of their speculative theorising with their practical politics, and to discover and disclose those essential ties of appropriate union, which linked their economics to their moral creed, to their social and political beliefs, and to their general philosophic bent. And, furthermore, he pertinently maintains that, as the agricultural ideas and programme of the Physiocrats themselves dictated their commercial and industrial proposals and reforms, so they cannot be fully understood without some reference to their critics and opponents, such as were the Mercantilists, for example. Nor again has he limited his researches to the principal writings of the recognised masters of the school, like Quesnay or like Mirabeau, or of their most brilliant pupils, such as Dupont, Le Trosne, Mercier de la Riviére, or Baudeau. He has, on the contrary, had recourse to the more obscure disciples, and even to the mass of anonymous writing contained in the voluminous journalistic publications which appeared, when their fame was at its zenith, bearing the Physiocratic *imprimatur*, and aided the active propaganda which was being conducted.

So large is the conception which our author has framed of the scope of his undertaking; and, accordingly, an introduction on the origins, both more distant and also less remote, of the movement, is followed by a book, giving a history in successive chapters of the school and the party itself, describing its entrance on the stage of thought, and exhibiting its rise to a dominating position in the intellectual and political world of France. In a second book the economic programme of the Economists, with the essential principle, from which all their other tenets ramify, of the exclusive productivity of agriculture, is set forth. The sterility of industry, the sterility of commerce, and the sterility of money followed from this central theory; and no less obviously were deduced the advantage of a large scale of agricultural enterprise, the desirability of active encouragement of that beneficial pursuit by the bestowal of rewards, and by the spread of scientific knowledge, by an exemption from all taxes except the "impôt unique" levied on rent alone, and by the provision of a remunerative price for agricultural products, and especially of corn, in enlarged markets, both at home and abroad. With the second volume, and his third book, Dr. Weulersse passes to the political, the moral and the general philosophic creed of the Physiocrats, and examines their belief in a "natural order." Their strenuous advocacy of freedom, their firm support of private property, and their strong leaning to a benevolent despotism exercised by an enlightened monarch, belong to the same department. In his fourth book he takes as his subject the realisation in practice of the programme of the school, and in the fifth and concluding book he gives a full account of the attacks made upon the system and of the defences offered by its upholders, while the last chapter of this final section contains a judicial and illuminating estimate of the general merits and defects of the writers, whose detailed history he has so diligently explored, and whose particular views and individual statements he has so carefully and minutely studied, and so faithfully presented afresh in this treatise.

From the standpoint of the conscientious economic historian no doubt, we imagine, can be felt that this work, which we have rapidly sketched, was well worth doing; and Dr. Weulersse has earned our sincere and lasting gratitude for the pains and the ability, and the combined sympathy and judgment, which he has devoted to what we are sure must have been a labour of great love. But a question may perhaps be raised from a different quarter in a different strain; and it may be asked, with some impatience, whether this body of doctrine, which savoured so much of paradox that it treated a large portion of the common activities of mankind as "unproductive," which believed in an unhistorical and unreal "natural order," lying beneath the so-called artificial arrangements of civilised mankind that were in truth ordinary and familiar, to which men should seek to approximate by removing every restriction upon individual liberty, which held that all taxation should be raised by an "impôt unique" on rent levied at the point where real wealth originated, and where alone "nature laboured along with man," and which accorded the flattering incense of a reverential homage, reserved properly for a veritable gospel, to a Table consisting of zig-zag lines—it may be asked whether all this assemblage of ideas, bound up as it might be, as Dr. Weulersse clearly shows, in a consistent plausible "ensemble," has much relevance to the conditions of the present day, or retains more than an antiquarian interest for those who have escaped from its imaginative absurdities. Yet it should be recollected that, as Dr. Weulersse points out, Henry George revived but recently the proposal of a single tax on rent, and we may add that a living English Chancellor of the Exchequer is credited with having stated that land nationalisation must and will be reached in this country by easy stages. The Physiocrats moreover represented a reaction, which was not unhealthy or unneeded, from the Colbertism which had preceded them, while the *Tableau Économique* may be regarded as the first attempt to frame a systematic conception and to supply an orderly account of the distribution of wealth. Furthermore, Adam Smith regarded the "agricultural" system of the French Economists "with all its imperfection" as the best Economics of his day, and through their unquestioned influence on the eminent author of the "Wealth of Nations" they may be justly credited with having been the creators of the economic science that we know. Such a tribute therefore of pious reverence as their latest French exponent has rendered to this body of men deserves, we would venture to pronounce, the attention of students of Economics in every age and land; for the rank attained by the French "Économistes" in the story of the systematic development of economic thought was and continues to be high. As a competent English interpreter of their opinions, Mr. Henry Higgs, has declared, "the force of their work is still not wholly spent." L.L.P.

8.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Alhaiza (A.). Charles Fourier et sa sociologie sociétaire. 76 pp., 8vo. Paris: Marcel Rivière et Cie., 1911. Price 75 c.

[A short account of Fourier, of his system of communism, and of the tentative efforts made at different times to put his system into practice. The book contains a bibliography.]

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* See also "Additions to the Library," page 777, *sqq.*

Bright (*Charles*). Imperial Telegraphic Communication. xxiv + 212 pp., maps, sm. 8vo. London: P. S. King and Son, 1911. Price 3*s*. 6*d*. net.

[A collection of papers which have been contributed at different times to different periodicals and institutions.]

Fairchild (*Henry Pratt*). Greek immigration to the United States. xvii + 278 pp., 8vo. New Haven: Yale University Press, 1911. Price $2.

[A study of the causes and effects of Greek immigration to the United States. It is based on investigations made by the author in both countries, and is a useful contribution to the sociological study of migration.]

Goldie (*H. G.*). Trade and the National Ideal. 157 pp., sm. 8vo. London, 1911. John Murray. Price 2*s*. 6*d*. net.

[The author advocates universal military service, the exclusion of undesirable aliens, small holdings as a help for the revival of agriculture and tariff reform, and, as a preliminary to the latter, the collection and publication of home trade statistics]

Hoffman (*Frederick L.*). Insurance Science and Economics. A practical discussion of present-day problems of administration, methods and results . . . xiii + 366 pp., 8vo. New York: The Spectator Company, 1911. Price $3.

[The author points out that while there is an extensive literature of insurance in all its branches, this is largely restricted to consideration of matters relating to office and administration. The books on the aspects of insurance in its relation to public policy are comparatively few. The present volume is intended for the better study of insurance as a branch of economics. The book is divided into nine chapters, each of which is followed by a bibliography on the subject discussed.

Lloyd George (*The Right Hon. David*), M.P. The People's Insurance. 161 pp., 8vo. London: Hodder and Stoughton, 1911. Price 1*s*. 2*d*. net.

[A reprint of Mr. Lloyd George's speech in the House of Commons on May 4 last when introducing the National Insurance Bill, the text of which is given, as well as an explanation of its scope.]

Macilwaine (*Sydney W.*). Medical Revolution. A plea for national preservation of health based upon the natural interpretation of disease. xii + 162 pp., 8vo. London: P. S. King and Son, 1911. Price 2*s*. 6*d*. net.

[The author's object is to "lay bare a false interpretation of Nature that still vitiates the scientific method of medicine; and, further, to show how the adoption of the natural interpretation of disease would introduce order and uniformity into all our methods, both scientific and practical."]

March (*Lucien*). De la Méthode dans les Sciences. 2^{e} Série. (Extrait. Chapitre sur la Statistique, par M. Lucien March.) 50 pp., sm. 8vo. Paris, 1911.

[This pamphlet summarises briefly the developments of statistical research and the value of statistics for administrative and other purposes.]

Montessus (*R. de*) and *d'Adhemar* (*R.*). Calcul Numérique. 1^{ere} partie: Operations arithmétiques et algébriques. 2^{e} partie: Integration. 248 + xii pp., sm. 8vo. Paris: O. Doin et Fils, 1911. Price 5 fr.

[This book forms part of the Library of Applied Mathematics, edited by M. d'Ocagne. It is divided into two parts, the first dealing with abridged arithmetical operations, and especially the calculation of roots, of equations, whether algebraic or transcendental. The second part deals mostly with the theory of integrals and of differential equations, and each part has a bibliography.]

Morison (*Sir Theodore*). The Economic Transition in India. 251 pp., 8vo. London, 1911. Mr. John Murray. Price 5*s*.

[Contains the substance of a course of lectures delivered at the London School of Economics in 1910. The author explains the economic conditions of India, past and present, and compares them with the conditions prevailing in certain parts of Europe.]

Parry (*M. S.*) and *Muraour* (*E. M.*). The A B C to Rubber Planting Companies in Malaya, Sumatra, and British North Borneo; their possible production, profits, and dividends for seven years. 2nd Edition, April, 1911. xix + 262 pp., 8vo. London, 1911. Price 2*s*. 6*d*. net.

Pulsford (*Edward*). The Imperial Conference, 1911. The Foreigner and the Commerce of the British Empire. 16 pp., 8vo. Sydney, 1911.

[The author is opposed to Preference, which would, he thinks, adversely affect British and Colonial trade.]

Punnett (*R. C.*). Mendelism. 3rd Edit. xiv + 176 pp., 8vo. London: Macmillan and Co., 1911. Price 5*s*.

[Since the first edition of this book, issued in 1905, rapid progress has been made in the study of heredity on the lines first discovered by Mendel. This has induced the author to re-write his book and, as it is intended for a wide public, only such experimental instances are given as are necessary to illustrate the story.]

Schiavi (*Alessandro*). Saggio di un'Inchiesta sul Lavoro a domicilio in Milano e Resoconto della discussione nel "Museo Sociale." (Supplement to La Riforma Sociale, May, 1911.) 8vo. 1911.

[An inquiry into the social conditions and hours of labour and earnings of home workers in Milan.]

Scott (*William Robert*), M.A. Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720. Vol. 3. Water Supply, Postal, Street Lighting, Manufacturing, Banking, Finance and Insurance Companies, also Statements relating to the Crown Finances. xii + 563 pp., 8vo. Cambridge: Cambridge University Press, 1911. Price 18*s*. net.

[This volume completes Part II of the book, and deals more especially with commercial undertakings at home, the former volume relating more to the shipping industry. Part I has yet to appear.]

Welton (*Thomas A.*). England's recent progress. An investigation of the statistics of migrations, mortality, &c., in the twenty years from 1881 to 1901 as indicating tendencies towards the growth or decay of particular communities. lxiv + 742 pp., 8vo. London: Chapman and Hall, Ltd., 1911. Price 10*s*. 6*d*. net.

[This volume, which contains a mass of information, embodies the statistical labours of the author in the field of vital statistics during the past fifty years. Many of the papers have been contributed to the *Journal*, and are based mostly on the census reports and the annual and other returns of the Registrar-General. The book is preceded by a collection of diagrams dealing with migration and mortality, and contains a large number of statistical appendices illustrative of the subjects under discussion.]

Amsterdam. Communications Statistiques. No. 26. Mortalité par Cancer à Amsterdam pendant 1862–1902. 8vo. 1911.

[A statistical study of the mortality from cancer in Amsterdam during forty years. The author, who died just as he had completed his work, considered his subject in relation to its distribution in different parts of the city, its frequency due to extreme old age, its increase since 1862, and the lesser predisposition of Jews to being attacked by the disease.]

Transvaal. Johannesburg. Report on Municipal Census of 1st-2nd October, 1910, with Appendix on errors that may be introduced by correcting death-rates by the Registrar-General's correction factor. By G. D. Maynard, F.R.C.S. 18 pp., fol. 1911.

Canada. Report on Trade of Canada for period from July 1, 1906, to March 31, 1910. By Mr. Richard Grigg. [Cd–5591.] 1911.

National Insurance Bill, 1911. Report of Actuaries in relation to Scheme of Insurance against Sickness, Disablement, &c., embodied in National Insurance Bill, 1911. [Cd–5681.] Fol. 1911.

Prisons. Report on the Eighth International Penitentiary Congress at Washington, October, 1910. By Sir E. Ruggles Brise, K.C.B. [Cd–5593.] 8vo. 1911.

Nationalities and Subject Races. Report of Conference held in Caxton Hall, Westminster, June 28-30, 1910. xii + 178 pp., 8vo. London: P. S. King and Son, 1911. Price 3*s.* 6*d.*

[The report of this Conference, which was the first of its kind, contains the papers read and the discussions thereon, and both cover a wide field of investigation.]

Tariff Commission. The Problems of the Imperial Conference and the Policy of Preference. 47 pp., 4to. London, 1911. Price 3*d.*

CURRENT NOTES.

The trade returns for the past month are on the whole satisfactory, although the imports have declined in value by 1,299,929*l.*, solely on account of the lower price of rubber. Prices generally are lower. The month, however, had two working days more than April. As compared with May, 1910, there is a decrease of 2·3 per cent. in imports, and an increase of 4,007,517*l.*, or 11·9 per cent., in exports. Re-exports show an increase of 540,689*l.*, or 6·5 per cent. The figures for the twelve months ending May, 1911, are summarised in the subjoined tables:—

[000's omitted.]

Imports.	Twelve months ending May, 1911.	Twelve months ending May, 1910.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	251,545,	262,522,	− 10,977,
II. Raw materials and articles mainly unmanufactured	266,063,	235,572,	+ 30,491,
III. Articles wholly or mainly manufactured	161,419,	153,951,	+ 7,468,
IV. Miscellaneous and unclassified (including parcel post)	2,539,	2,630,	− 91,
Total merchandise	681,566,	654,675,	+ 26,891,
Imports of bullion and specie	65,939,	69,088,	− 3,149,

[000's omitted.]

Exports.	Twelve months ending May, 1911.	Twelve months ending May, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	27,369,	24,083,	+ 3,286,
II. Raw materials and articles mainly unmanufactured	54,042,	52,545,	+ 1,497,
III. Articles wholly or mainly manufactured	358,383,	316,928,	+ 41,455,
IV. Miscellaneous and unclassified (including parcel post)	8,565,	7,193,	+ 1,372,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,747,	11,975,	+ 1,772,
II. Raw materials and articles mainly unmanufactured	60,693,	62,057,	− 1,364,
III. Articles wholly or mainly manufactured	28,348,	25,373,	+ 2,975,
IV. Miscellaneous and unclassified (including parcel post)	193,	284,	− 91,
Total, British, foreign and colonial	551,340,	500,438,	+ 50,902,
Exports of bullion and specie	59,167,	62,919,	− 3,752,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending May, 1911.	Twelve months ending May, 1910.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	42,168,	41,107,	+ 1,061,
Total, British and foreign, *cleared* with cargoes	58,944,	56,879,	+ 2,065,

Mr. Sauerbeck's index number of prices for May is 80·3, as against 80·0 in April; the average of the eleven years, 1867-77, being taken as 100. There is thus a further rise in the index number, which has shown an upward tendency since October last year. Last month prices for corn and coffee ruled somewhat higher, while there was a rather important decline for all sorts of meat and butter. Among materials, copper improved to some extent, while tin rose considerably, and coal was firm. Textiles experienced very little alteration. Fine wool was weak, but there was a further rise for jute. Sundry materials had little change in the aggregate. Articles of food were 73·4, as compared with 74·0; and materials were 85·3, as compared with 84·4. Silver remained unchanged. The *Economist* index number is 2,540, as compared with 2,554 at the end of April, thus showing a fall of 14 points.

According to the Board of Trade *Labour Gazette*, the state of the labour market during April was as follows:—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
April, 1911	395	764,548	21,407	2·8
March, 1911	395	759,605	23,035	3·0
April, 1910	416	699,932	30,475	4·4

Employment during April continued good. On the whole it was better than in March and considerably better than a year ago. The coal mining industry and the engineering, shipbuilding, furnishing, wood-working, cotton, woollen, worsted, hosiery and pottery trades were all well employed. There was some slight recovery in the iron and steel manufacture, and a seasonal improvement in building and brickmaking. On the other hand, there was some slackening in employment in the linen, jute, and lace trades, and a reduction in the number of pig-iron furnaces in blast. As compared with a year ago there was a marked improvement in employment in the engineering, shipbuilding, furnishing, woodworking, and cotton trades. There was little change in coal mining, but in the jute, linen and lace trades and at blast furnaces there was some decline.

In connection with the preliminary Census results, given on p. 782, it is of especial interest, in view of Mr. Snow's Paper in the last number of this JOURNAL, to compare the actual populations with the populations as estimated by the Registrar-General. The estimated populations, it is true, refer to the middle of the year 1911, not the date of the Census, but for a first rough comparison this small difference may be ignored. For the 63 county boroughs for which comparison is possible the percentage errors are as follows:—

Actual population in excess of estimate by	Number of boroughs.	Actual population in defect of estimate by	Number of boroughs.
30—25 per cent.	1	0— 5 per cent.	21
25—20 ,, ...	—	5—10 ,, ...	14
20—15 ,, ...	1	10—15 ,, ...	13
15—10 ,, ...	1	15—20 ,, ...	—
10— 5 ,, ...	1	20—25 ,, ...	1
5— 0 ,, ...	10		
		Total	63

It will be seen that only in 14 cases out of the 63 has the population been under-estimated; in the great majority of cases the population of the county boroughs has increased less rapidly than during the last decade, with the result that the Registrar-General's method shoots over the mark. The most serious errors are those made in the case of Coventry (actual population 106,000 against an estimate of 83,000) and West Hartlepool (actual population 64,000 against an estimate of 84,000). The population of the City of London exceeded the estimate by 22 per cent. (actual 19,657, estimate 16,069), but the numbers of the inhabitants of the metropolitan boroughs have been uniformly and without exception over-estimated, the errors being as follows:—

Actual population in defect of estimate by	Number of metropolitan boroughs.
0— 5 per cent.	7
5—10 ,, ...	14
10—15 ,, ...	5
15—20 ,, ...	2
Total	28

These figures emphasise the importance of the subject dealt with by Mr. Snow. Methods of estimation based on local data would surely have avoided such large errors as those made in the case of Coventry or West Hartlepool, and would hardly have been crediting several of the metropolitan boroughs with such continuously swelling populations. Mr. Snow's footnote on p. 579 of the JOURNAL *re* the death and birth-rates in the metropolitan boroughs would seem to be justified.

The success of the International Conference on Unemployment held in Paris in September last justified its promoters in believing that a permanent organisation is required, and it was decided to found an International Association for the study of Unemployment. The object of the Association is to collect and circulate information and to collate the experience of all those who are engaged in combating the evil of unemployment. Sections of the Association have been formed in a number of countries, including Great Britain. Applications for forms of membership should be sent to Miss S. Sanger, 4, Bloomsbury Square, London, W.C.

It is announced that Professor Stanley Jevons has resigned his position as Professor of Economics and Political Science at the University of Wales on his appointment as managing director of a new housing reform company.

The International Association for Labour Legislation has issued its first comparative report on the administration of labour laws. The report, which is prefaced by a brief historical review of the considerations which led to its execution, deals with the general application of the law in the various countries; the numbers, methods of procedure, and constitution of the inspectorial staffs; the extent to which the workers co-operate in the administration of the law; the general control of administration; and the reforms which are called for. The results of the report are summarised in the subjoined table:—

Statistics of the administration of labour laws in Europe. Compiled by the International Labour Office. 1906-09.

	1	2	3		4	5	6	7	8
State.	Area under inspection. sq.kilom	Occupied in industry and mines.	Per cent. of col. 2 of all occupied persons.	Per sq. kilom.			Inspection districts.		Number of inspectors.
				Year.	Inhabitants.	Industrial and mining population.	Number.	Average area, sq. kilom.	
1. German Empire	540,778	11,256,254	41·9	1907	112·08	20·82	FW 228 M 91	2,371·8	FW '09 : 543 M 111
2. Austria	300,008	4,049,320	23·3	'01	87·17	13·50	'09 : 38 '98 : 35	'07 : 7,894·9 '08 : 8,771·7 '07 : 8,571·7	'09 : 107 '08 : 84 '07 : 82 M 72
3. Hungary	324,851	1,184,400	13·6	'02	59·27	3·64	41	7,923·2	52 M 42
4. Bosnia and Herzegovina	51,027	101,664	—	'10	37·15	1·99	1 M 1	51,027·0	2 M 3
5. Belgium.........	29,455	1,372,251	41·6	'00	227·25	46·57	M 27 M 9	2,945·5	38 M 98
6. Bulgaria	96,345	—	—	'05	41·89	—	—	—	10
7. Denmark	38,455	275,743	24·9	'06	63·70	7·16	19	2,024·0	24
8. Spain	504,552	1,067,177	—	1889	36·90	2·11	6	84,092·0	21
9. France	536,464	6,993,202	35·5	1906	72·63	13·03	'09 : 126 '06 : 115 M 15	'09 : 4,257·7 '96 : 4,594·8	'09 : 139 '07 : 133 '06 : 128 M '09 : 170
10. United Kingdom	312,525	8,363,857	45·8	'01	132·66	26·79	52 M 8	'09 : 6,010·1	'09 : 200 M '09 : 42
11. Italy*	102,880	1,453,249	20·8	'01	141·07	14·12	4 M 10	25,720·0	20 M 88
12. Liechtenstein	159	ca. 2,000	20·0	'06	60·69	12·58	1	159·0	1
13. Luxembourg	2,586	ca. 36,750	45—50	'09	94·40	14·21	1	2,586·4	2
14. Norway	322,987	255,387	25·8	'00	7·20	0·79	'07 : 2	161,493·5	2
15. Netherlands...	33,079	650,576	33·7	1899	154·03	19·67	9	3,675·4	51 M 4
16. Portugal	92,339	1,044,354	19·7	1900	58·98	11·31	5	18,467·8	21 M 30
17. Roumania......	131,353	ca.198,000	—	'10	52·27	1·51	7 M 6	18,764·7	20 M 10
18. Russia (Europe)†	4,466,581	5,596,889	17·9	1897	24·10	1·25	'09 : 230 '06 : 228 M 63	'09 : 19,415·6 '06 : 19,585·9	'09 : 268 '06 : 269 M 106
19. Finland	333,140	288,343	10·6	1900	8·15	0·87	5	66,628·0	7
20. Sweden	438,755	413,023	20·9	'00	11·82	0·92	8 M 6	'09 : 54,844·4	8 + 1 insp.spéc.) M 6
21. Switzerland ...	41,324	699,402	44·9	'00	80·46	16·92	3 25 Cant.	13,774·6	9 M 1 cantonal : 7

Abbreviations :—F = Factories. M = Mines. W = Workshops. W* = id. sans restaur., cabarets, etc.

* The inspection of labour applies actually to one portion of the kingdom (Piedmont, Liguria, Lombardy, Venetia, Emilia, and Tuscany); all the figures given refer only to this territory, which comprises 85 per cent. of the industries of the kingdom. The Chamber of Deputies has recently approved a measure for extending inspection to the whole kingdom.

† The figures relating to mines (columns 6, 8, 12, 13) include Russia in Asia.

Statistics of the administration of labour laws in Europe—contd.

	9	10	11	12	13
State.	Number of visits.	Establishments visited.		Establishments subject to inspection.	
		Number.	Number of workmen.	Number.	Number of workmen.
1. German Empire	'09 : F 205,953 W* 32,021 M 44,903	'09 : F 141,637 W* 27,321 M 2,977	'09 : F 4,402,617 W* — M 813,618	'09 : F 264,431 W* 93,871 M 3,123	'09 : F 5,394,460 W — M 814,765
2. Austria	'09 : 27,500 '08 : 26,192 '07 : 24,938 M 2,331	'09 : 25,672 '08 : 24,504 '07 : 23,451 M 871	'09 : 1,019,013 '08 : 983,553 '07 : 922,677 M 157,894	Tot. ind. Etabl. 1,000,111 '09 : F 14,829 '08 : F 14,260 '09 : M 942	Tot.'02 : 2,351,446 '09 : M 166,480
3. Hungary	9,905 M 520	9,433 M 31	351,028 M 35,158	10,390 '09 : M 148	— '09 : M 87,098
4. Bosnia and Herzegovina	123	'09 : 123	'09 : 14,429	'07 : F 167 W 1,633 '09 : M 17	'07 : F 24,735 W 7,690 '09 : M 4,745
5. Belgium.........	13,232 M 11,937	13,797 M 2,450	— M 218,829	Tot. ind. Etabl. 1,408,855 ca. 80,000 M 2,450	— ca. 818,500 M 218,829
6. Bulgaria	—	—	—	—	—
7. Denmark	15,932	F 4,304 Total : 10,777	F 96,896	F 4,304	F 96,896
8. Spain	7,376	7,188	270,624	—	—
9. France	'09 : 200,623 '07 : 181,842 '06 : 178,007 '09 : M 15,608	'09 : FW 168,686 '07 : 149,863 '06 : 148,251 '09 : M 8,068	'09 : FW 2,641,211 '07 : 2,303,454 '06 : 2,184,023 '09 : M 297,174	'09 : FW 548,069 '09 : MC 39,398 '06 : FW 548,225 '06 : MC 38,747	'09 : FW 4,122,227 MC 364,963 '06 : FW 3,864,007 MC 339,171
10. United Kingdom	'09 : 424,737 '08 : 361,424 '07 : 352,707	'09 : F 89,369 W 132,672 '08 : F 82,426 W 117,803	—	'09 : F 112,479 W 151,270 MC 11,271	'07 : F 4,438,744 '04 : W 688,756 '09 : MC 1,126,372
11. Italy	'09 : 7,611 '08 : 9,289 '07 : 7,484 M 966	'09 : 5,439 '08 : 7,630 '07 : 6,290 M 966	'09 : 231,647 '08 : 372,941 '07 : 452,849 M 37,243	26,481 M 14,132	1,197,127 M 171,387
12. Liechtenstein	'09 : 6	5	666	43	ca. 1,500
13. Luxembourg	'09 : 425	'09 : 365	'09 : 35,750	422	36,300
14. Norway	State officials 701 4,581	—	—	'09 : 4,076	99,145
15. Netherlands...	20,463 M 540	15,624 M 20	202,753 M 5,847	FW 66,329 M 20	FW ca. 400,000 M 5,847
16. Portugal	3,536 M 54	2,313 M 54	89,533 M 7,824	2,313 M 54	85,709 M 7,824
17. Roumania......	—	—	—	F 563	F ca. 70,000
18. Russia(Europe)	'09 : 24,779 '06 : 24,575	'09 : 12,046 '06 : 10,569		'09 : 14,710 '06 : 14,190 '08 : M 4,611	'09 : 1,831,396 '06 : 1,723,177 '08 : M 586,085
19. Finland	3,047 2,126	—	—	9,165	127,075
20. Sweden	—	—	—	19,701	ca. 350,000
21. Switzerland ...	8,416 M 72 (excl. Cant.)	—	—	'09 : F 7,633 M 72	'09 : F 310,345 M 1,266

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

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May 20—Tramway accounts: *Williams* (*L. R.*).

May 27—The verification of assets: *Blackwell* (*Philip H.*).

June 3—Trust deeds and deeds of arrangement: *Gowans* (*John Stuart*).

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AUSTRIA—

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May—Die Bewertung der Krankenkassenstatistik: *Rosenfeld* (*Dr. Siegfried*). Zur Statistik des Fremdenverkehres in Österreich: *Pfaundler* (*Dr. H.*).

EGYPT—

L'Égypte Contemporaine. No. 7. *May*, 1911—Éléments de la balance des comptes de l'Égypte: *Chédiac* (*Ch.*). L'organisation et le développement de l'enseignement agricole, industriel et commercial en Égypte: *Wells* (*Sidney H.*). L'organisation du crédit en Égypte par les warrants commerciaux et agricoles: *Polier* (*Léon*). Variations des prix des contrats de coton à la Bourse d'Alexandrie. (mars-avril, 1911): *Levi* (*I. G.*).

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May 16—L'unité sociale de la Bretagne: *Touzaud* (*Daniel*). (*Continued in next issue, June* 1.) Les types sociaux de simple récolte et d'extraction dans la région parisienne: *Charpin* (*Frédéric*). Le congrès de l'action populaire: *Boissieu* (*H. de*). Les deux divisions rationnelles de l'industrie et leurs répercussions sociales. La fabrication sur commande et la fabrication en stock: *Durien* (*J.*). (*Continued in next issue, June* 1.)

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ITALY—

Giornale degli Economisti e Rivista di Statistica. April, 1911—Di un indice che misura l'impiego monetario dell' oro relativamente a quello dell' argento e le sue variazioni dal 1520 ad oggi: *Alivia (G.).* L'applicazione della matematica allo studio dei fenomeni economici e sociali: *Amoroso (L.).* Il premio sull' oro: *Del Vecchio (G.).* La tavola di sopravvivenza della popolazione maschile italiana (1901) interpolata mediante la formola del Makeham: *Balducci (G.).*

La Riforma Sociale. May, 1911—L'aiuto dello stato al credito popolare: *Wolff (Henry W.).* Gruppo industriale parlamentare. L'aumento delle spese pubbliche e la politica finanziaria in Inghilterra: *Borgatta (Gino).*

LIST OF ADDITIONS TO THE LIBRARY.

During the month ended June 8, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Austria—

Labour. Protokoll der 29ten Sitzung des Arbeitsbeirates vom 30. Jänner 1911. 8vo. 1911. (The Austrian Labour Department.)

—— Verzeichnis der in 1900-10 Sozialen Rundschau enthaltenen Gesetze, Verordnungen, Erlässe &c. 8vo. 1911. (*Id.*)

Belgium—

Le Monde. Encyclopédie mensuelle illustrée. Anthologie des revues de tous les pays. 1er Année No. 1. Juin. 1911. 8vo. 1911. (The Publisher.)

Denmark—

Copenhagen. Folketællingen for Kobenhavn og Nabokummuner den 1. Februar 1911. 37 pp., 8vo. 1911. (The Municipal Statistical Bureau.)

France—

Labour. Conseil Supérieur du Travail. 20e Session Novembre 1910. Compte-Rendu. 4to. 1911. (The Ministry of Labour.)

Italy—

Agriculture. Annali di Agricultura, 1910. No. 262. Atti del Consiglio Ippico dal 1905 al 1910. 8vo. 1910. (The Ministry of Agriculture.)

Japan—

Census. État de la population de l'Empire du Japon au 31 Décembre 1908. Fol. 1911. (The General Statistical Bureau.)

Luxemburg, Grand Duchy of—

Berufs- und Gewerbezählung, 1907. Band 2, Gewerbliche Betriebsstatistik. 2. Die Arbeitszeit und die Lohnverhältnisse in den gewerblichen Betrieben. Die offenen Verkaufsstellen. Das Hausgewerbe. 8vo. 1911. (Major P. G. Craigie.)

—— Erhebung über die wirtschaftliche Lage der Privatbeamten. 8vo. 1910. (Major Craigie.)

Netherlands—

Verslag van de werking en de toepassing van de Schepenwet en den gang van den dienst in de verschillende districten der scheepvaartinspectie over 1910. 7 pp., 8vo. 1910. (The Central Statistical Bureau.)

Amsterdam. Communications Statistiques. No. 26. Mortalité par Cancer à Amsterdam pendant 1862–1902. 8vo. 1911. (The Municipal Statistical Bureau.)

—— Statistische Mitteilungen. N. 31. Verzeichnis der in der Statistischen Abteilung der Internationalen Hygiene-Ausstellung Dresden 1911 vom Statistischen Amt vorgeführten graphischen Darstellungen, nebst Erläuterndem Zahlenmaterial. 4to. 1911. (The Municipal Statistical Bureau.)

Sweden—

Labour. Arbetstidens Längd inom Industri och Handtverk i Sverige. 8vo. 1911. (The Swedish Labour Department.)

(a) **Foreign Countries**—*Contd.*

United States—

Labour. Report on condition of Woman and Child Wage-earners in United States. Vol. 4. The Silk Industry. Vol. 5. Wage-earning Women in Stores and Factories. Vol. 6. Beginnings of Child Labour Legislation in certain States: a comparative study. 3 vols., 8vo. 1910. (The Department of Commerce and Labour.)

California. 14th Biennial Report of Bureau of Labor Statistics, 1909-10. 8vo. 1910. (The Bureau.)

Connecticut. 31st Report (2nd Biennial) of the State Board of Health, for two years ended September 30, 1910. 8vo. 1911. (The Board.)

Massachusetts. Municipal Bulletin No. 4. Outstanding Indebtedness of certain cities and towns of Massachusetts against which no Sinking Funds are being accumulated, or for the extinguishment of which no annual payments of principal are being made. 34 pp., 8vo. 1911. (The Bureau of Statistics.)

Missouri. Surplus Products of Missouri Counties for 1909, including Government Land in Missouri subject to Homestead—Increase in Land Valuation. Other useful information. (Supplement to 32nd Annual Report of the Bureau of Labor Statistics. 8vo. 1911. (The State Bureau of Labor.)

—— Toilers of Missouri, 1910. Statistics covering organized labor for 1909. 8vo. 1911. (*Id.*)

Philadelphia. Textile Industries of Philadelphia. The Greatest Manufacturing Center in the World. 50 pp., 8vo. 1911. (The Commercial Museum.)

American Economic Association. Bulletin. Series 4. No. 2. April, 1911. Papers and Discussions of the 23rd Annual Meeting, December, 1910. 8vo. 1911. (The Association.)

Johns Hopkins University Studies. Series 28:—
- No. 1. History of reconstruction in Louisiana. (Through 1868): *J. R. Ficklen.* 8vo. 1910. (The Johns Hopkins Press.)
- No. 2. The Trade Union Label: *E. R. Spedden.* 8vo. 1910. (*Id.*)
- No. 4. David Ricardo. A centenary estimate: *J. H. Hollander.* 8vo. 1910. (*Id.*)

Uruguay—

Mensaje del Presidente de la República á la Asamblea General al inaugurarse el 1^{er} Periodo de la xxiv Legislatura 15 de Febrero de 1911. 8vo. 1911. (The Bureau of International Exchange.)

International—

International Association for Labour Legislation. Publications. No. 7. Report of Sixth General Meeting of Committee of the Association held at Lugano September 26th to 28th, 1910, with Annual Reports of the International Association and of the International Labour Office and Appendices. 174 pp., 8vo. London, 1911. (Messrs. P. S. King and Son.)

International Labour Office. First Comparative Report on Administration of Labour Laws. Inspection in Europe. 109 pp., 8vo. London, 1911. (*Id.*)

Nationalities and Subject Races. Report of Conference held in Caxton Hall, Westminster, June 28-30, 1910. xii + 178 pp., 8vo. London, 1911. (*Id.*)

(b) **India and Colonies.**

India, British—

Bengal Gazetteers. Feudatory States of Orissa. 8vo. 1910. (The India Office.)

—— District Gazetteers. Vol. 22, Santal Parganas. Vol. 23, Burdwan. Vol. 24, Nadia. 3 vols., 8vo. 1910. (*Id.*)

(b) India and Colonies—*Contd.*

India, British—*Contd.*

Central Provinces District Gazetteers. Bilaspur District. Vol. A. Descriptive. 8vo. 1910. (The India Office.)

—— District Gazetteers. Akola, Amraoti, and Buldana Districts. Vol. B. Statistical Tables (1891-1907). 3 vols., sm. 4to. 1909-10. (*Id.*)

—— Gazetteers. Chhattisgarh Feudatory States. 8vo. 1909. (*Id.*)

—— *and Berar* District Gazetteers. Akola District. Vol. A. Descriptive. 8vo. 1910. (*Id.*)

Eastern Bengal and Assam. District Gazetteers. Bogra. 8vo. 1910. (*Id.*)

Punjab District Gazetteers. Vol. 29 A. Attock District. Part A. 1907. 8vo. 1909. (*Id.*)

United Provinces of Agra and Oudh. District Gazetteers. Vol. 6, Aligarh. Vol. 17, Shahjahanpur. Vol. 24, Jhansi. Vol. 31, Gorakhpur. 4 vols. 8vo. 1909-10. (*Id.*)

Union of South Africa—

Transvaal. Johannesburg. Report on Municipal Census of 1st-2nd October, 1910, with Appendix on errors that may be introduced by correcting death-rates by the Registrar-General's correction factor. By G. D. Maynard, F.R.C.S. 18 pp., fol. 1911. (Mr. G. D. Maynard.)

(c) United Kingdom and its several Divisions.

United Kingdom—

Aliens. Report of Departmental Committee as to a Receiving House for Alien Immigrants at Port of London. Vol 1. Report and Appendix. [Cd–5575]; and vol. 2. Minutes of Evidence. [Cd–5576.] 2 vols. 1911. (Purchased.)

Canada. Report on Trade of Canada for period from July 1, 1906, to March 31, 1910. By Mr. Richard Grigg. [Cd–5591.] 1911. (Purchased.)

Coal Mines Bill. Copy of Bill and Table of Comparison, showing Amendments of Existing Law. [Cd–5604.] 1911. (Purchased.)

Colonial Reports. Southern Nigeria. Report on Mineral Survey, 1907-8. [Cd–5517.] 8vo. 1911. (Purchased.)

Finance (1909-10) Act, 1910. Copy of Regulations in relation to Tobacco Grown in United Kingdom. (40.) 8vo. 1911. (Purchased.)

Inland Revenue Department (Valuation Staff). (88.) 1911. (Purchased.)

Japan. No. 1. (1911.) Treaty of Commerce and Navigation between Great Britain and Japan, signed at London, April 3, 1911, with prefatory note and appendices. [Cd–5556.] 1911. (Purchased.)

Mines. Royal Commission on Mines. Minutes of Evidence with Index. Vol. 5. [Cd–5642.] 1911. (The Commission.)

National Insurance Bill, 1911. Report of Actuaries in relation to Scheme of Insurance against Sickness, Disablement, etc., embodied in National Insurance Bill, 1911. [Cd–5681.] Fol. 1911. (Purchased.)

National Insurance Bill. Arrangement of Clauses. 1911. (Purchased.)

Prisons. Report on the Eighth International Penitentiary Congress at Washington, October, 1910. By Sir E. Ruggles-Brise, K.C.B. [Cd–5593.] 8vo. 1911. (Purchased.)

Street Accidents caused by Vehicles. (99.) 1911. (Purchased.)

Sugar. Commercial. No. 2. (1911.) Report of British Delegate to International Sugar Commission, February, 1911. [Cd–5557.] 1911. (Purchased.)

Trade, Commerce, and condition of People. (133.) 1911. (Purchased.)

England and Wales—

London County Council. Homeless Persons. Report by Medical Officer, submitting result of census of homeless persons taken on night of February 17, 1911. Fol. 1911. (Purchased.)

Poplar. Report on infant mortality in certain portions of the Borough. 3 pp., fol. 1911. (The Medical Officer of Health.)

(c) **United Kingdom and its several Divisions**—*Contd.*

Ireland—

Agricultural Prices. (93.) Fol. 1911. (Purchased.)

(d) Authors, &c.

Alhaiza (*A.*). Charles Fourier et sa sociologie sociétaire. 8vo. Paris, 1911. (Marcel Rivière et Cie.)

Arminjon (*Pierre*). La situation économique et financière de l'Égypte. Le Soudan égyptien. Avec deux cartes et deux diagrammes hors texte. 708 pp., 8vo. Paris, 1911. (Purchased.)

Barker (*D. A.*). Cash and Credit. 8vo. Cambridge, 1910. (The Cambridge University Press.)

Bright (*Charles*). Imperial Telegraphic Communication. xxiv + 212 pp., maps, sm. 8vo. London, 1911. (P. S. King and Son.)

Cotsworth (*M. B.*). Cotsworth's "Direct Calculator (Series O)," containing over 1,000,000 distinct calculations for expediting and ensuring accuracy in Multiplication, Division, Averages, Percentage, Interest, Exchange, and general Calculation by all combinations of numbers from 1 to 1,000 (larger numbers being most quickly worked in groups of three figures), arranged for Instant and "Direct" Reference by Marginal indices, &c. Second Edition. 4to. 1911. (Purchased.)

Fairchild (*Henry Pratt*). Greek immigration to the United States. xvii + 278 pp., 8vo. New Haven, 1911. (Mr. Henry Frowde.)

Goldie (*H. G.*). Trade and the National Ideal. 157 pp., sm. 8vo. London, 1911. (John Murray.)

Haack (*Dr. Hermann*). Geographen-Kalender. In Verbindung mit vielen Fachgenossen herausgegeben von, Jahrgang 9. 1911. 824 pp., 8vo. Gotha, 1911. (Purchased.)

Hoffman (*Frederick L.*). Insurance Science and Economics. A practical discussion of present-day problems of administration, methods and results . . . xiii + 366 pp., 8vo. New York, 1911. (The Spectator Company.)

Lloyd George (*The Right Hon. David*), M.P. The People's Insurance. 161 pp., 8vo. London, 1911. (Hodder and Stoughton.)

Macilwaine (*Sydney W.*). Medical Revolution. A plea for national preservation of health based upon the natural interpretation of disease. xii + 162 pp., 8vo. London. (P. S. King and Son.)

March (*Lucien*). De la Méthode dans les Sciences. 2ᵉ Série. (Extrait. Chapitre sur la Statistique, par M. Lucien March.) 50 pp., sm. 8vo. Paris, 1911. (The Author.)

Montessus (*R. de*) and *d'Adhemar* (*R.*). Calcul Numérique. 1ᵉʳᵉ partie: Operations arithmétiques et algebriques. 2ᵉ partie: Integration. 248 + xii pp., sm. 8vo. Paris, 1911. (O. Doin et Fils.)

Morison (*Sir Theodore*). The Economic Transition in India. 251 pp., 8vo. London, 1911. (Mr. John Murray.)

Parry (*M. S.*) and *Muraour* (*E. M.*). The A B C to Rubber Planting Companies in Malaya, Sumatra, and British North Borneo; their possible production, profits, and dividends for seven years. 2nd Edition, April, 1911. xix + 262 pp., 8vo. London, 1911. (Mr. M. S. Parry.)

Pfitzner (*Johannes*). Die Entwicklung der Kommunalen Schulden in Deutschland. 85 pp., 8vo. Leipzig, 1911. (The Author.)

Pulsford (*Edward*). The Imperial Conference, 1911. The Foreigner and the Commerce of the British Empire. 16 pp., 8vo. Sydney, 1911. (The Author.)

Punnett (*R. C.*). Mendelism. 3rd Edit. xiv + 176 pp., 8vo. London, 1911. (Macmillan and Co.)

Schiavi (*Alessandro*). Saggio di un'Inchiesta sul Lavoro a domicilio in Milano e Resoconto della discussione nel "Museo Sociale." (Supplement to La Riforma Sociale, May, 1911.) 8vo. 1911. (The Editor, La Riforma Sociale.)

THE PRELIMINARY CENSUS RESULTS.

I. ENGLAND AND WALES.

In reply to Dr. Addison, Mr. John Burns made the following statement in the House of Commons on May 24: "I am informed by the Registrar-General that, according to the preliminary examination of the returns obtained at the recent Census, the information desired by my honourable friend is as follows.

"It will be understood that the figures for 1911 are subject to correction. They are the provisional numbers derived from summaries furnished by the local registration officers."

Census of England and Wales, 1911.

Population of England and Wales and of the Administrative Counties and County Boroughs in 1901 *and* 1911.

	Population.		Increase (+) or decrease (−) per cent. between 1901 and 1911.
	1901.	1911.	
England and Wales	32,527,843	36,075,269	+ 10·91
62 Administrative Counties	22,543,995	25,204,009	+ 11·80
75 County Boroughs	9,983,848	10,871,260	+ 8·89
Administrative Counties.			
England.			
Bedfordshire	171,707	194,625	+ 13·35
Berkshire	180,354	195,814	+ 8·57
Buckinghamshire	197,046	219,583	+ 11·44
Cambridgeshire	120,264	128,325	+ 6·70
Isle of Ely	64,495	69,759	+ 8·16
Cheshire	593,885	676,356	+ 13·89
Cornwall	322,334	328,131	+ 1·80
Cumberland	266,933	265,780	− 0·43
Derbyshire	484,846	560,129	+ 15·53
Devonshire	436,938	457,343	+ 4·67
Dorsetshire	202,063	223,274	+ 10·50
Durham	768,024	929,340	+ 21·00
Essex	816,640	1,062,000	+ 30·05
Gloucestershire	321,442	329,037	+ 2·36
Herefordshire	114,125	114,269	+ 0·13
Hertfordshire	258,423	311,321	+ 20·47
Huntingdonshire	54,125	55,583	+ 2·69
Kent	936,240	1,021,033	+ 9·06
Lancashire	1,578,145	1,739,524	+ 10·23
Leicestershire	225,911	249,361	+ 10·38
Lincolnshire—			
The parts of Holland	77,610	82,860	+ 6·76
The parts of Kesteven	103,962	111,332	+ 7·09
The parts of Lindsey	206,528	237,864	+ 15·17

	Population.		Increase (+) or decrease (−) per cent. between 1901 and 1911.
	1901.	1911.	
London	4,536,267	4,522,961	− 0·29
Middlesex	792,476	1,126,694	+ 42·17
Monmouthshire	230,806	312,078	+ 35·21
Norfolk	311,315	321,748	+ 3·35
Northamptonshire	207,485	213,754	+ 3·02
Soke of Peterborough	41,122	44,722	+ 8·75
Northumberland	304,730	371,521	+ 21·92
Nottinghamshire	274,716	344,135	+ 25·27
Oxfordshire	137,124	146,228	+ 6·64
Rutlandshire	19,709	20,347	+ 3·24
Shropshire	239,783	246,306	+ 2·72
Somersetshire	385,111	407,345	+ 5·77
Southampton	363,650	433,604	+ 19·23
Isle of Wight	82,418	88,193	+ 7·01
Staffordshire	671,490	739,105	+ 10·07
Suffolk, East	189,170	203,227	+ 7·43
Suffolk, West	117,553	116,914	− 0·54
Surrey	519,766	675,985	+ 30·06
Sussex, East	218,399	242,153	+ 10·88
Sussex, West	151,276	176,323	+ 16·56
Warwickshire	347,722	408,291	+ 17·42
Westmoreland	64,409	63,575	− 1·29
Wiltshire	271,394	286,876	+ 5·70
Worcestershire	357,402	427,064	+ 19·49
Yorkshire, East Riding	144,748	154,780	+ 6·93
Yorkshire, North Riding	286,036	314,814	+ 10·06
Yorkshire, West Riding	1,389,176	1,585,135	+ 14·11
WALES.			
Anglesey	50,606	50,943	+ 0·67
Brecknockshire	54,213	59,298	+ 9·38
Cardiganshire	61,078	59,877	− 1·97
Carmarthenshire	135,328	160,430	+ 18·55
Carnarvonshire	125,649	125,049	− 0·48
Denbighshire	131,582	144,796	+ 10·04
Flintshire	81,485	92,720	+ 13·79
Glamorganshire	531,833	743,110	+ 39·73
Merionethshire	48,852	45,573	− 6·71
Montgomeryshire	54,901	53,147	− 3·19
Pembrokeshire	87,894	89,956	+ 2·35
Radnorshire	23,281	22,589	− 2·97
County Boroughs.			
Barrow-in-Furness	57,586	63,775	+ 10·75
Bath, City of	49,839	50,729	+ 1·79
Birkenhead	110,915	130,832	+ 17·96
Birmingham, City of	523,179	525,960	+ 0·53
Blackburn	129,216	133,064	+ 2·98
Blackpool	47,348	58,376	+ 23·29
Bolton	168,215	180,885	+ 7·53
Bootle	60,235	69,881	+ 16·01
Bournemouth	59,762	78,677	+ 31·65
Bradford, City of	279,767	288,505	+ 3·12
Brighton	123,478	131,250	+ 6·29
Bristol, City of	339,042	357,059	+ 5·31
Burnley	97,043	106,337	+ 9·58

	Population.		Increase (+) or decrease (−) per cent. between 1901 and 1911.
	1901.	1911.	
Burton-upon-Trent	50,386	48,275	− 4·19
Bury	58,029	58,649	+ 1·07
Canterbury, City of	24,899	24,628	− 1·09
Cardiff, City of	164,333	182,280	+ 10·92
Chester, City of	38,309	39,038	+ 1·90
Coventry, City of	69,978	106,377	+ 52·01
Croydon	133,895	169,559	+ 26·64
Derby	114,848	123,433	+ 7·48
Devonport	70,437	81,694	+ 15·98
Dudley	48,733	51,092	+ 4·84
Eastbourne	43,574	52,544	+ 20·59
Exeter, City of	47,185	48,660	+ 3·13
Gateshead	109,888	116,928	+ 6·41
Gloucester, City of	47,955	50,029	+ 4·32
Great Yarmouth	51,316	55,808	+ 8·75
Grimsby	63,138	74,663	+ 18·25
Halifax	104,944	101,556	− 3·23
Hastings	65,528	61,146	− 6·69
Huddersfield	95,047	107,825	+ 13·44
Ipswich	66,630	73,939	+ 10·97
Kingston-upon-Hull, City of	240,259	278,024	+ 15·72
Leeds, City of	428,968	445,568	+ 3·87
Leicester	211,579	227,242	+ 7·40
Lincoln, City of	48,784	57,294	+ 17·44
Liverpool, City of	704,134	746,566	+ 6·03
Manchester, City of	644,873	714,427	+ 10·79
Merthyr Tydfil	69,228	80,999	+ 17·00
Middlesbrough	91,302	104,787	+ 14·77
Newcastle-upon-Tyne, City of	247,023	266,671	+ 7·95
Newport (Monmouth)	67,270	83,700	+ 24·42
Northampton	87,021	90,076	+ 3·51
Norwich, City of	113,922	121,493	+ 6·65
Nottingham, City of	239,743	259,942	+ 8·43
Oldham	137,246	147,495	+ 7·47
Oxford, City of	49,336	53,049	+ 7·53
Plymouth	107,636	112,042	+ 4·09
Portsmouth	188,928	231,165	+ 22·36
Preston	112,989	117,113	+ 3·65
Reading	72,217	75,214	+ 4·15
Rochdale	83,114	91,437	+ 10·01
Rotherham	54,349	62,507	+ 15·01
St. Helens	84·410	96,566	+ 14·40
Salford	220,957	231,380	+ 4·72
Sheffield, City of	409,070	454,653	+ 11·14
Smethwick	54,539	70,681	+ 29·60
Southampton	104,824	119,039	+ 13·56
Southport	48,083	51,650	+ 7·42
South Shields	100,858	108,649	+ 7·72
Stockport	92,832	108,693	+ 17·09
Stoke-on-Trent	214,712	234,553	+ 9·24
Sunderland	146,077	151,162	+ 3·48
Swansea	94,537	114,673	+ 21·30
Tynemouth	51,366	58,822	+ 14·52
Walsall	86,430	92,130	+ 6·59
Warrington	64,242	72,178	+ 12·35
West Bromwich	65,175	68,345	+ 4·86

	Population.		Increase (+) or decrease (−) per cent. between 1901 and 1911.
	1901.	1911.	
West Ham	267,358	289,102	+ 8·13
West Hartlepool	62,627	63,932	+ 2·08
Wigan	82·428	89,171	+ 8·18
Wolverhampton	94,187	95,333	+ 1·22
Worcester, City of	46,624	47,987	+ 2·92
York, City of	77,914	82,297	+ 5·63

CENSUS OF ENGLAND AND WALES, 1911.

Population of the Metropolitan Boroughs, of the Administrative County of London, of the Outer Ring, and of Greater London, in 1901 *and* 1911.

Metropolitan Boroughs.			
Battersea	168,907	167,793	− 0·66
Bermondsey	130,760	125,960	− 3·67
Bethnal Green	129,680	128,282	− 1·08
Camberwell	259,339	261,357	+ 0·78
Chelsea	73,842	66,404	− 10·07
Deptford	110,398	109,498	− 0·82
Finsbury	101,463	87,976	− 13·29
Fulham	137,289	153,325	+ 11·68
Greenwich	95,770	95,977	+ 0·22
Hackney	219,110	222,587	+ 1·59
Hammersmith	112,239	121,603	+ 8·34
Hampstead	81,942	85,510	+ 4·35
Holborn	59,405	49,336	− 16·95
Islington	334,991	327,423	− 2·26
Kensington	176,628	172,402	− 2·39
Lambeth	301,895	298,126	− 1·25
Lewisham	127,495	160,843	+ 26·16
Paddington	143,976	142,576	− 0·97
Poplar	168,822	162,449	− 3·77
St. Marylebone	133,301	118,221	− 11·31
St. Pancras	235,317	218,453	− 7·17
Shoreditch	118,637	111,463	− 6·05
Southwark	206,180	191,951	− 6·90
Stepney	298,600	280,024	− 6·22
Stoke Newington	51,247	50,683	− 1·10
Wandsworth	231,922	311,402	+ 34·27
Westminster, City of	183,011	160,277	− 12·42
Woolwich	117,178	121,403	+ 3·61
City of London	26,923	19,657	− 26·99
Administrative County of London	4,536,267	4,522,961	− 0·29
Outer Ring	2,045,135	2,730,002	+ 33·49
Greater London*	6,581,402	7,252,963	+ 10·20

* Greater London corresponds with the districts of the City of London Police and the Metropolitan Police. The Outer Ring is that portion of Greater London which lies outside the County of London.

II. IRELAND.

The following figures appear in the Preliminary Report of the Census of Ireland for the year 1911:—

TABLE I.

Provinces and counties.	1911.			Increase or decrease of persons between 1901 and 1911.		
				Number.		
	Total.	Males.	Females.	Increase.	Decrease.	Rate per cent.
Province of Leinster.						
County—						
Carlow	36,151	18,424	17,727	—	1,597	4·2
Dublin	476,909	226,199	250,710	28,703	—	6·4
Kildare	66,498	37,557	28,941	2,932	—	4·6
Kilkenny	74,821	38,460	36,361	—	4,338	5·5
King's	56,769	29,746	27,023	—	3,418	5·7
Longford	43,794	22,657	21,137	—	2,878	6·2
Louth	63,402	31,983	31,419	—	2,418	3·7
Meath	64,920	33,806	31,114	—	2,577	3·8
Queen's	54,362	28,544	25,818	—	3,055	5·3
Westmeath	59,812	31,801	28,011	—	1,817	2·9
Wexford	102,287	51,585	50,702	—	1,817	1·7
Wicklow	60,603	31,104	29,499	—	221	0·4
Total	1,160,328	581,866	578,462	7,499	—	0·7
Province of Munster.						
County—						
Clare	104,064	53,699	50,365	—	8,270	7·4
Cork, E.R.	267,472	133,545	133,927	—	5,217	1·9
,, W.R.	123,718	63,280	60,438	—	8,204	6·2
Kerry	159,268	81,173	78,095	—	6,458	3·9
Limerick	142,846	72,096	70,750	—	3,252	2·2
Tipperary, N.R.	63,958	32,873	31,085	—	3,857	5·7
,, S.R.	87,993	45,377	42,616	—	4,424	4·8
Waterford	83,766	42,260	41,506	—	3,421	3·9
Total	1,033,085	524,303	508,782	—	43,103	4·0
Province of Ulster.						
County—						
Antrim	478,603	225,997	252,606	16,969	—	3·7
Armagh	119,625	58,252	61,373	—	5,767	4·6
Cavan	91,071	47,695	43,376	—	6,470	6·6
Donegal	168,420	84,552	83,868	—	5,302	3·1
Down	304,589	145,799	158,790	15,064	—	5·2
Fermanagh	61,811	31,691	30,126	—	3,619	5·5
Londonderry	140,621	67,591	73,030	—	3,783	2·6
Monaghan	71,395	35,867	35,528	—	3,216	4·3
Tyrone	142,437	71,594	70,843	—	8,130	5·4
Total	1,578,572	769,038	809,534	—	4,254	0·3

TABLE I—*Contd.*

Provinces and counties.	1911.			Increase or decrease of persons between 1901 and 1911.		
				Number.		Rate per cent.
	Total.	Males.	Females.	Increase.	Decrease.	
Province of Connaught.						
County—						
Galway	181,686	94,133	87,553	—	10,863	5·6
Leitrim	63,557	32,740	30,817	—	5,786	8·3
Mayo	191,969	96,254	95,715	—	7,197	3·6
Roscommon	93,904	48,472	45,432	—	7,887	7·7
Sligo	78,850	39,998	38,852	—	5,233	6·2
Total	609,966	311,597	298,369	—	36,966	5·7
Total of Ireland	4,381,951	2,186,804	2,195,147	—	76,824	1·7

TABLE II.—*Showing the number of inhabited houses and population of provincial towns having in* 1901 *a population exceeding* 10,000, *with the increase or decrease in population between* 1901 *and* 1911.

Towns.	Inhabited houses.		Population.		Increase or decrease in population between 1901 and 1911.		
	1901.	1911.	1901.	1911.	Increase.	Decrease.	Rate per cent.
Belfast	67,108	74,973	349,180	385,492	36,312	—	10·4
Cork	11,568	12,070	76,122	76,632	510	—	0·7
Londonderry	6,506	6,869	39,892	40,799	907	—	2·3
Limerick	5,577	5,788	38,151	38,403	252	—	0·7
Waterford	4,417	4,514	26,769	27,430	661	—	2·5
Galway	2,275	2,260	13,426	13,249	—	177	1·3
Dundalk	2,370	2,479	13,076	13,128	52	—	0·4
Drogheda	2,712	2,623	12,760	12,425	—	335	2·6
Newry	2,405	2,330	12,405	11,956	—	449	3·6
Lurgan	2,359	2,549	11,782	12,135	353	—	3·0
Lisburn	2,293	2,479	11,461	12,172	711	—	6·2
Wexford	2,110	2,136	11,168	11,455	287	—	2·6
Ballymena	2,096	2,257	10,886	11,376	490	—	4·5
Sligo	1,757	1,834	10,870	11,163	293	—	2·7
Kilkenny	1,941	1,979	10,609	10,513	—	96	0·9
Clonmel	1,629	1,646	10,167	10,277	110	—	1·1
Portadown	2,079	2,389	10,092	11,727	1,635	—	16·2
Total	121,202	131,175	668,816	710,332	41,516	—	6·2

Vol. LXXIV.] [Part VIII.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

JULY, 1911.

UNDER *the* CROWN.

By SIR J. ATHELSTANE BAINES, C.S.I.

[Read before the Royal Statistical Society, June 13, 1911, the President, the Right Hon. LORD GEORGE HAMILTON, G.C.S.I., in the Chair.]

IN doing me the honour of asking me to provide the Paper on this occasion the Council suggested that the subject should be pertinent to those great events of the day which have brought amongst us so many of our fellow subjects from all quarters of the globe. I have already dealt, at different times, with the trade of the Empire, when the thorns which now beset that topic were hardly above the surface, and, more recently, with some aspects of the population as shown in the census returns, the continuation of which must await the results of the enumeration of this year. I now propose to lay before you the results of an attempt to analyse the expansion of the Empire in area and population during what I may appropriately call the Victorian Era, touching briefly upon its most prominent features and the tendencies they seem to indicate.

I have taken 1841 as the starting point, not for historical reasons only, but also because shortly before that date there appeared the first, and still one of the best, methodical review of British possessions abroad, which includes a careful estimate of the population of each unit at the time. I need hardly admit before those who have worked in this field that the information available regarding the population of many of the colonies is very defective up to 1871, and is even now a matter of estimate only, so that recourse must be had in such cases to computation upon the best data available.

Accuracy being thus qualified, the population in question increased between 1841 and 1911 from 203,221,000 to 418,735,000, or by 106 per cent. The first point is to distinguish between the growth of population upon existing territories, and the increase due to the acquisition of new possessions. The population of the Empire of 1841, then expanded, according to my estimate, by 68·2 per cent. The balance of the increase, amounting to 37·8 per cent., is to be credited to territory added since that date. Here again, however, the element of growth comes in as the acquisition took place at different intervals; and, so far as I can see, 10·5 per cent. out of the 37·8 per cent. increase occurred since the territories became part of the Empire. We can therefore set down the growth at 159,971,000, and the accretion by annexation at 55,543,000, or 78·7 per cent. of the one, and 27·3 of the other. The decennial figures are given in Table I, and graphically in Diagrams A and B.

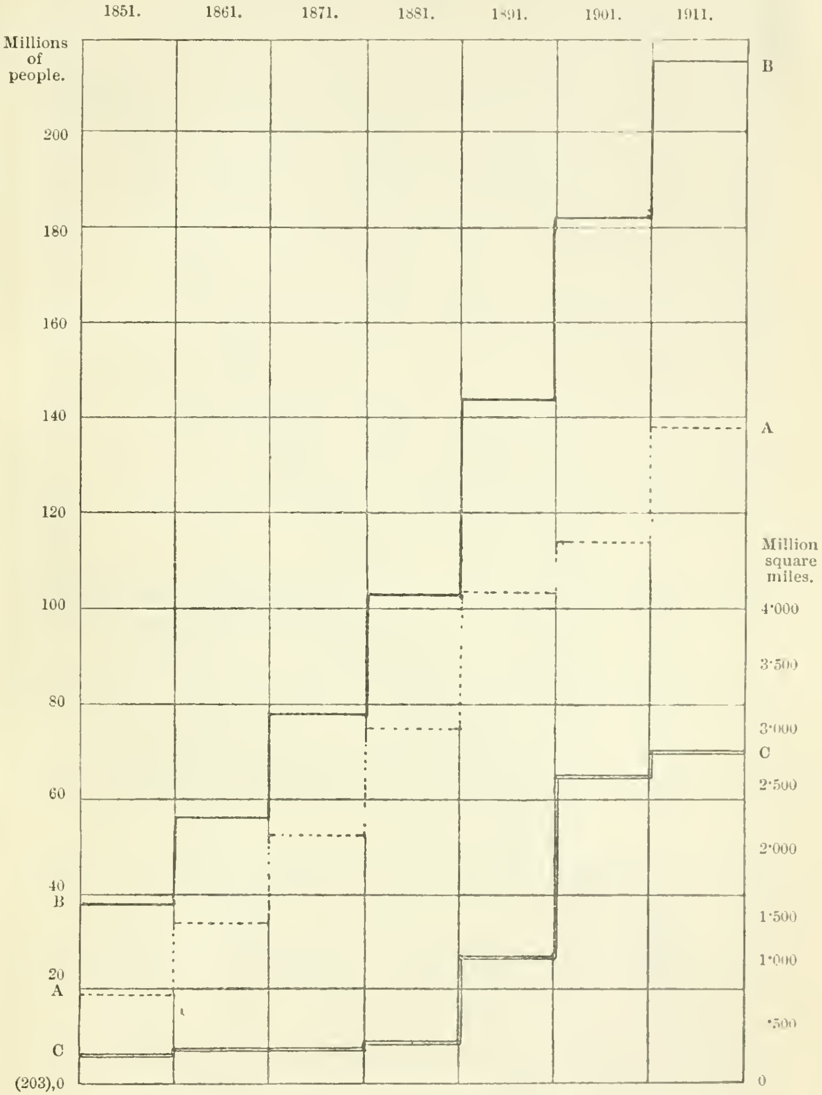
TABLE I.—*Population and area.*

	Population, in thousands.	Increase.					Area.	
		Total.	1. By acquisition since 1841.	2. By growth.			Sq. miles.	Additions.
				A. On territories of 1841.	B. On later additions.	Total growth.		
1841....	203,221	—	—	—	—	—	8,526,641	—
'51....	240,931	37,710	18,469	19,241	—	19,241	8,778.241	251,600
'61 ..	258,568	17,637	1,297	14,381	1,959	16,340	8,810,413	32,172
'71....	280,741	22,173	62	19,651	2 460	22,111	8,813,833	3,420
'81....	306,116	25,374	781	22,111	2,482	24,593	8,865,345	51,512
'91....	346,887	40,771	6,644	29,202	4,925	34,127	9,598,726	733,381
1901....	385,417	38,531	25,846	9,889	2,796	12,685	11,141,971	1,543,245
'11....	418,735	33,318	2,444	24,059	6,815	30,874	11,331,243	189,272
Total	—	215,514	55,543	138,534	21,437	159,971	—	2,804,602

The area has naturally not expanded in proportion to the population, and to the 8,526,641 square miles of 1841, the addition has been but 2,804,602, or 32·9 per cent. The general relations between population and area during the 70 years, that is, the successive variation in density, are shown in a proportional form in Diagram B. Starting with 24 persons per square mile, the ratio increased steadily to 36 in 1891, when a check to the growth of population in India, and the incorporation of large areas of sparsely peopled territory in Africa, reduced the proportion to 35, which recovered by the end of the period to 37. Thus, whilst the population has doubled, the pressure upon the land has increased by but little over one half.

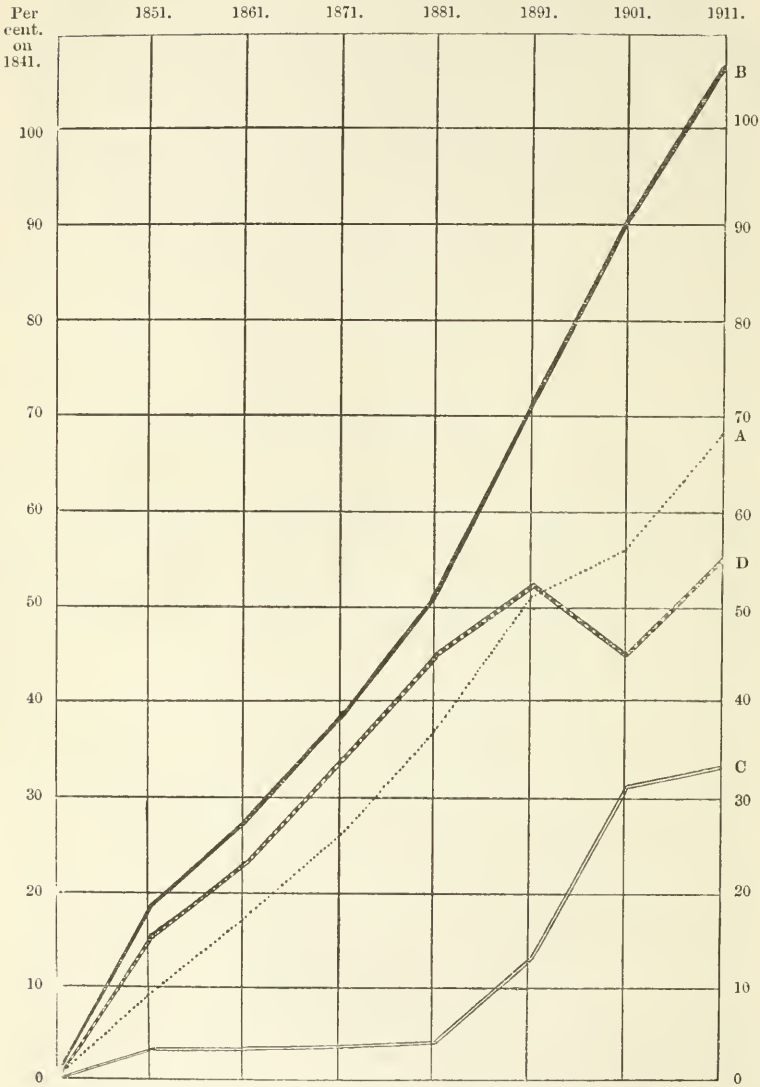
Leaving on one side for the present the newly-acquired possessions, the rate of growth of the population of 1841 has been slow, considering the large area of thinly peopled land available. The explanation of this may be found in Table II, which shows that the retarding influence has been the low rate of increase in India and

DIAGRAM A.



Line A represents increase of population *on area of* 1841.
" B " *total* increase of population.
" C " increase of area, on scale of 25,000,000 people per 1,000,000 square miles.

DIAGRAM B.



Line **A** = proportional increase of population on territory of 1841.
„ B = „ „ „ total area.
„ C = „ „ area.
„ D = „ „ population per square mile of total area.

this kingdom. In the former, the seventy years added 58 to every 100 inhabitants of 1841, or 10 less than the general rate; and this kingdom, with a diminishing Irish community, acquired but 69, or 1 above the average. Far higher is the rate in the New World, especially in Australasia, which could scarcely be called peopled up to 1851. South Africa, too, seems to have multiplied its inhabitants tenfold; but until the last ten years or so, Canada, with a relatively higher yet still very sparse population, showed a remarkable lagging in covering its vast field of habitable territory, and was not, indeed, far in advance of the comparatively long-settled Ceylon. On the whole, if from the territories of 1841 we subtract India and this kingdom, the rate of growth will be raised from 68 per cent. to 467. By the year 1871 it had produced 281 for every 100 persons thirty years before, whilst the Empire of 1841, as a whole, could only show 126; and this lead increased as years went on.

TABLE II.—*Relative increase of population and area.*

Territory.	Relative increase of population (1841 = 100).		Persons per square mile.		
	1881.	1911.	1841.	1881.	1911.
A. Territories of 1841. Total	**137**	**168**	**23·8**	**32·7**	**40·1**
Ditto without India and the United Kingdom	340	567	0·62	2·10	3·28
Tropical territory	135	161	130	175	209
Ditto without India	254	361	14·8	37·5	53·4
India..................	133	158	144	192	229
United Kingdom......	130	169	221	287	372
Canada and Newfoundland	329	542	0·35	1·20	1·99
Australia and New Zealand ...	1,291	2,561	0·07	0·90	1·79
Cape and Natal	484	1,076	1·1	5·4	11·9
West Indies, &c.	168	248	60	101	149
Ceylon	285	423	38	109	161
B. Total, including additions ...	**151**	**206**	**23·8**	**34·5**	**36·9**
Ditto without India and the United Kingdom	340	1,309	0·62	2·10	6·2
Temperate territories	149	205	4·1	6·1	8·4
Ditto without United Kingdom	442	778	0·25	1·12	1·96
Tropical territories	150	202	130	160	112
Ditto without India	270	1,690	14·8	37·2	27·0
South Africa	682	3,337	1·1	6·4	6·5

We can thus appreciate the position occupied by India and the United Kingdom in relation to the enormous aggregate population of the Empire, as now constituted, an aggregate which has been estimated to amount to a quarter of the whole population of the earth. India alone contained about 85 per cent. of the British subjects of 1841, and even now, in spite of the more rapid growth of other countries, it accounts for no less than three-quarters. Taken together with this country, it left, in 1841, only a little over 2 per cent. in the rest, a proportion which now stands at 14 per cent. The specific population, too, or the number of persons per square mile, is similarly affected by the exclusion of these two countries, as they are the only two, with the exception of the smaller territories of Ceylon and the West Indies, which support more than 100 to the mile. In the rest of the Empire, including the two last-mentioned units, the corresponding number was only 0·58 in 1841, 2·67 in 1891, and 6·20 according to the latest estimate. Putting the case in absolute, instead of proportional, numbers, the population of the Empire outside India and this kingdom in 1841 was about 4,500,000; in 1885, it was 15,000,000 and a little over; but by the end of the period with which I am dealing it had risen to 58,500,000.

A glance at Table III will show this preponderance of the two exceptional populations in another light. We are dealing here with the geographical distribution of the increase of population since 1841, including that of the territories added since that date. It will be seen that no less than two-thirds of the increase of 215·5 millions appertain to India, by virtue of annexation or of internal growth. The growth of the inhabitants of the Mother Country accounts for 8·5 per cent., leaving only one-fourth for the rest of the territories, half of which accrued in Tropical Africa.

Table III.—*Geographical distribution of the increase in population.*

Country.	Increase of population, in thousands.			Percentage on total increase.		
	(1841) growth.	By acquisition.	Total.	By growth.	By acquisition.	Total.
United Kingdom ...	18,386	—	18,386	8·53	—	8·53
Canada	6,055	—	6,055	2·81	—	2·81
Australia..................	5,302	—	5,302	2·46	—	2·46
South Africa	2,266	5,287	7,553	1·05	2·45	3·50
Tropical Africa	804	25,574	26,378	0·37	11·87	12·24
West Indies	1,308	—	1,308	0·61	—	0·61
The Far East............	519	3,055	3,574	0·24	1·41	1·65
Ceylon......................	3,125	—	3,125	1·45	—	1·45
India	100,662	42,117	142,779	46·71	19·54	66·25
Others......................	107	947	1,054	0·05	0·45	0·50
Total	138,534	76,980	215,514	64·28	35·72	100·00
Temperate	29,850	262	30,112	13·85	0·12	13·97
Tropical	106,418	71,431	177,849	49·38	33·14	82·52
Sub-tropical	2,266	5,287	7,553	1·05	2·46	3·51

This brings us face to face with the all-important question of climate. In 1841, 82 per cent. of the area lay within the temperate zone, whilst 86 per cent. of the population dwelt in the tropics. By 1911, annexation or the extension of protective suzerainty in other parts of the world had reduced the former proportion to 62 per cent., but the population of the temperate countries remained steady at 14 per cent., and the ratio of the tropical population fell to 84. The tropical area, however, rose from 16 to 28. The remainder, representing 2 per cent. of the area and 11 per cent. of the population, constitutes a mid-way zone which had risen into prominence during the interval. This region, which is confined to South Africa, I have called sub-tropical, because though the climate is temperate, and thus adapted to colonisation by Europeans, the existence of a numerically larger coloured population places the white minority in a dominating position over a lower civilisation, and precludes, accordingly, the development of the country as an exclusively white man's heritage, like Canada and Australia. The general increase of population in the two main regions has been on much the same lines as that already described. Including India and this country, the tropical and the temperate possessions have respectively doubled their population. In 1841 the weight of the United Kingdom was equivalent to 94 per cent. of the total in the zone to which it appertains, but in 1911, before the rapid advance of the younger communities, it had fallen to 77. In this case the addition to the area was insignificant. In the tropics, on the contrary, as in South Africa, the extension was large. India, at the beginning of the period, covered 89 per cent. of the tropical area, but though, by annexation, &c., it had expanded by 48 per cent. before 1911, its proportion to the total had receded to 56 per cent. It retained, nevertheless, over 89 per cent. of the tropical population as compared with nearly 99 in 1841. If we exclude, as before, the United Kingdom from the temperate category, the rate of increase rises to 678 per cent. over the population of 1841; and the similar withdrawal of India from the tropical total raises the rate to no less than 1,590 per cent. We thus find that to-day our population of 418·7 millions comprises 45·2 in the Motherland, 13·5 millions in other temperate countries; nearly 8 millions, chiefly coloured, in South Africa, and 352 coloured millions in the tropics, of whom 37·2 are outside India, principally in Africa, on "claims "pegged out for posterity."

We can now pass on to the connection of the racial factor with the forms of government by which British rule is maintained over this motley multitude. The grouping adopted in Table IV is based upon the facts of to-day, irrespective of changes which may have taken place since 1841. The first group is that of the Dominions, or self-governing communities. Next come the Crown Colonies, consisting chiefly of islands and coast settlements, appropriated, very largely in the earlier days of British enterprise, under an almost instinctive appreciation of the value to a maritime nation of points of vantage in the sea or at the mouth of estuaries; an instinct which gives point to a favourite anecdote of Napoleon of an English nobleman who, visiting Venice for the first time, tasted the water, and finding it to be salt, exclaimed with unaffected but gratified surprise that the place must be British. India, as a Dependency, has been placed under the head of Crown Colonies, though, as shown above, it is necessary to treat of it apart from the rest. The remaining class is that of the Protectorates, a term of comparatively modern and somewhat special application. I have not, therefore, included under it the Indian States under their own chieftains, their relations with the paramount power being very different from those of the rest.

TABLE IV.—*Climatic and political distribution.*

	1841.		1881.		1911.	
	Area.	Population.	Area.	Population	Area.	Population.
A. Temperate	**6,974,007**	**28,560**	**6,977,591**	**42,540**	**6,977,591**	**58,672**
Dominions	6,967,369	28,414	6,967,369	42,170	6,967,369	58,157
Crown Colonies	6,638	146	6,638	184	6,638	254
Protectorates	—	—	3,584	186	3,584	261
B. Sub-Tropical	**209,356**	**233**	**249,544**	**1,592**	**1,204,368**	**7,786**
Dominions	209,356	233	239,251	1,432	479,500	5,733
Crown Colony	—	—	10,293	160	10,293	280
Protectorates	—	—	—	—	714,575	1,773
C. Tropical	**1,343,278**	**174,428**	**1,638,210**	**261,984**	**3,149,284**	**352,277**
India	1,194,130	172,222	1,477,836	256,021	1,766,597	315,001
Crown Colonies	149,148	2,206	160,374	5,963	250,985	9,127
Protectorates	—	—	—	—	1,131,702	28,149
Total, Dominions	7,176,725	28,647	7,206,620	43,602	7,446,869	63,890
,, Crown Colonies	155,786	2,352	177,305	6,307	267,916	9,661
,, Protectorates	—	—	3,584	186	1,849,861	30,183
India	1,194,130	172,222	1,477,836	256,021	1,766,597	315,001
Total	**8,526,641**	**203,221**	**8,865,345**	**306,116**	**11,331,243**	**418,735**

The expansion of these groups of territory respectively must be dealt with very briefly. The Dominions, being mainly in the temperate zone, where extension of territory is—to put it mildly—improbable, have increased their population ninefold, counting the recent incorporation of South African States, and omitting the Mother Country. The Crown Colonies have received considerable additions in area, amounting to over 70 per cent., in the South Seas and in the South and West of Africa, and, including the new territories, have trebled their population, without considering the moderate relative increase of the millions of India. The Protectorates, now estimated to have a population of over 30 millions, on an area of nearly 1,850,000 square miles, are a new feature in the Imperial balance-sheet, and, with the exception of Cyprus, Rhodesia and Bechuana, are all within the tropics. In round numbers, apart from the Mother Country, 18·7 millions are under self-government; half that population immediately under the direct administration of the Crown; 315 millions under the Government of India; and the rest equally dependent, under other forms, upon the protection, care, and developing impetus for which we have made ourselves responsible.

The expansion I have been endeavouring to trace is remarkable, not merely for its magnitude, as expressed in terms of land and people, but even more for its diversity, its enormous range of widely-differing conditions, each involving its own momentous and difficult questions of administration or Imperial relations. With such questions this Paper is not concerned, but in bringing it to a conclusion I will dwell for a moment upon that factor in the position towards which our interest and attention cannot but be specially directed at this moment—which suggested, indeed, the title of the Paper—and which is directly connected with the two features in the subject which I have tried to place in the strongest relief, viz., the additions, great in both number and extent, to our Dependencies in the Tropics, and, again, the increase and development of the self-governing Dominions overseas. The latter have grown, indeed, into vigorous Nationalities, with every sign of still more marked advance in power and prosperity. In their present stage, however, they are not, in a political sense, among the Great Powers of the world, and it is to their position in the Empire that they owe their security and independence. Still more forcibly is this the case with the races less advanced, materially, morally and intellectually, and less progressive in temperament, whom it is our endeavour to inspire with full confidence in the power and will of the Empire to defend them against aggression from outside, "pacisque "imponere morem" at home. India, again, with its ancient and elaborate civilisation, is now, even more than when Lord Derby spoke the words half a century ago, "a great glory, a great "responsibility, and a great danger" to the Empire, without the protection of which invasion and anarchy would again be its portion. The key of the Empire is thus still here, at the heart of the Empire, but in a wider sense than Lord Beaconsfield had in mind when he used this phrase. Dependence is a tie neither inspiring nor permanent; but what is taking place in our midst to-day, and will be made even more manifest in the great ceremonies of next week, is evidence of the existence of a bond between us and our fellow-subjects across the seas stronger and more durable than the knowledge that the wealth and resources of the Empire are behind them in times of stress. The Dominions wax greater, richer and stronger, but the nearer they approach the level of the Motherland, the higher the value they place upon what they have not, cannot have, and for which they can get no substitute—that never-dying epitome of the traditions, might and glory of the Empire, the Crown of all the Britains. To the rest, not of our own or kindred race, forms of government are abstractions which make no appeal to them, but a Personality, permanent and above all local authorities, who come and go, is understood by all. I myself know the deep personal reverence in which our late Queen was held by all classes in India. Only last week, too, I heard from one of our visitors from South Africa how, when peace was declared, the portrait of Her late Majesty was hung by the burgher's wife alongside that of their earlier idol, the Queen of Holland, whilst the Boer members of a League of Conciliation, who had demurred to any title involving the then moot terms of loyalty or patriotism, accepted with acclamation that of Victoria. The individual, no doubt, counted for much in these instances, but it is perfectly certain that the same appreciation will be felt towards Her successors.

We should realise, therefore, that it is not merely to witness a magnificent pageant that our fellow subjects have come amongst us from all parts of the world; nor, on our parts, that it is simply a tribute of the respect we feel towards the great Personality on the Throne, or the verbal testimony to His world-wide heritage, but the recognition of a vital fact in Imperial politics, the living symbol of the unity of the Empire, to which we give expression when we pray for the "safety, honour and welfare of our Sovereign and His Dominions."

PROCEEDINGS *on* JUNE 13.

THE PRESIDENT, as Chairman, in moving a vote of thanks to Sir Athelstane Baines, said the Paper was a record of the marvellous growth and development of their Empire during the last seventy years; and what was most satisfactory was, that while the population under the British flag had so very largely increased in numbers, there had also been a great increase in prosperity and comfort, and that in those parts of the Empire which were inhabited by coloured races they had, during that period, succeeded in introducing forms of government and of legislation which were compatible with the ideals of humanity and of civilisation. What was very wonderful was not so much the extent and population of the British Empire as the small size of the Islands which were the nursery of the British race, and from which that great Empire had sprung. It was hardly possible to realise that out of so small an area there had been created an Empire with the largest and most varied population of which history had any record. There was one point in the Paper which required emphasis. Sir Athelstane Baines had pointed out how rapid in recent years had been the growth of the white population in India, South Africa, and Australia. Looking back upon their history and at the forms of competition to which they were now subject, had they not got near to the end of the advantages which their insular position gave them over their other competitors? There was truth in the anecdote Sir Athelstane related of Napoleon—that an English nobleman thought that wherever the water tasted salt, there the British flag was supreme; and, no doubt, in the old days, when they had the greatest navy in the world and the greatest number of maritime ships, it was easier for them with those advantages to get access to coasts or remote countries, and thus they obtained a great and almost unique commerce as compared with other nations. But of recent years the enormous development of railroads had given Continental nations an advantage over them, who were in an island surrounded by the sea. Pekin and Lisbon were now practically connected by railways, and that process of extension was going on all over the world; and so it seemed to him that these great nations who were living on the Continent—which was thus becoming more and more linked up by railways, and brought more personally into contact in various ways—had advantages over them who were cooped up in a comparatively small place, and that an island. Therefore, he did not think they could possibly contemplate in the future that the population of this country would grow with anything like the same rapidity as in the past. But, on the other hand, in those great countries of almost unlimited territory—Canada, South Africa, and Australia—the advantages of railway expansion would, and must, add rapidly to their population; and, therefore, the advantages those who were situated on great continents might get from the multiplication of railroads were advantages in which their friends in Canada, Australia, or South Africa would equally participate. There was another matter which he thought was a subject for great congratulation—that medical science and research had now so successfully dealt with various tropical diseases that parts of the globe which previously were considered uninhabitable by white people were now immune from many of the terrible diseases that were associated with them. This record of growth was wonderful in itself, but what was perhaps even more wonderful was that the inhabitants of the different parts of the British Empire, situated in localities so different from one another, and having, necessarily, different interests owing to the very different environments in which they were located, should still desire to be connected with the mother country, and decade by decade should show that they more and more appreciated that tie. Sir Athelstane Baines was right in saying that the great ceremony which was to take place next week, however magnificent it might seem, was really an outward symbol of the unity and the consolidation of the British Empire. They owed much to their last two Sovereigns. Queen Victoria did an inestimable service to the Throne. She gave it character and efficiency. Her son followed well in her footsteps, and clothed the Crown with popularity. They had now a young couple on the Throne who during the short time that they had occupied their exalted position had shown great capacity and a tendency to tread in the footsteps of their own immediate predecessors. It was remarkable that the more democratic the British Empire became (and the growth of democracy was unquestionable) the more power the Throne acquired as an instrument of unification and consolidation of those territories in which that democratic feeling prevailed. Sir Athelstane Baines had put before them, as it were statistically, what a splendid symbol the Coronation would be to the hundreds of millions residing in the British Empire; and they would hope that the illustrious couple then enthroned would for many many years occupy their place, and thus add to that growing sense of unity and consolidation which was the foundation and the strength of their Empire.

Major CRAIGIE, in seconding the vote of thanks, said he had more than one reason for cordially thanking Sir Athelstane Baines, who had put his subject into clearer and better shape than could have been done when, in a Presidential Address, something like ten years ago, he (the speaker) dealt, but not in so ambitious a manner, with the extension of the British Empire as compared with the extension of other parts of the globe. If there had been an opportunity for discussing it he should have liked to have asked his good colleague for more details with reference to the area, at the very earliest period, at the top of the column in Table I. For at the time of his former attempt to inquire into this matter, no doubt owing to the defective statistics to which he had referred, he was disposed to put the total area of the then Empire at a somewhat lower figure than the $8\frac{1}{2}$ millions of square miles which were mentioned in the table. He was sure they all felt they owed most hearty thanks for the treat they had had, and for the suggestive record of figures, which would bear fruit later when they had time to consider them.

The following candidates were elected Fellows of the Society:—

John Blue.
H. Percy Monckton.
John Rowland.
Clement R. Stiles.

RECEPTION BY THE PRESIDENT, COUNCIL, AND OFFICERS.

In accordance with the announcement which appeared in the *Journal* last month, the President, Council, and Officers of the Society were "at home" to Fellows and their friends at the Society's house on June 13. A number of visitors from the Dominions were present, and there was a large attendance of ladies. The ordinary aspect of the offices and the library was transformed by floral decorations, which, together with the bright sunshine, the dresses of the ladies, and the delightful view of the Embankment Gardens, must have removed from the minds of visitors the persistent suspicion that statistics are necessarily dull and call for a dingy environment. It is at least gratifying to observe that the display of calculating machines which had been arranged for the occasion attracted the close attention of the visitors.

The eighth ordinary meeting was held after the reception, at the rooms of the Royal Society of Arts, when Sir J. Athelstane Baines gave his address, "Under the Crown," which appears on page 787. He prefaced the reading of the paper with some remarks on the unusual character of the day's proceedings, observing that the ladies who were present were asked to visit the Royal Statistical Society in its home in order to see them at work with the instruments of their trade. This statement was, however, demurred to by the President, who declared, amid laughter, that he thought there was hardly a single Fellow who, put before one of those "wonderful, uncanny instruments," would, in spite of their infallibility, have arrived at results which were compatible with the accepted rules of mathematics.

The following is the list and description of the mechanical appliances exhibited, for the loan of which the Society is indebted to those whose names are given. An explanation of the machine and its mode of working was in most cases given by skilled attendants in charge of them:—

The "Classicompteur" Printing Machines. (*The Library Bureau, Ltd., 4, Cheapside, E.C.*)

The Classicompteur Printing Machine, invented by Monsieur Lucien March, Chief of the Bureau de la Statistique Générale de la France, has been used by his department for tabulating the Census returns and for compiling statistics required by Government departments and large commercial enterprises. The unit principle of recording information is of great advantage in connection with this tabulator, as a preliminary sorting of the cards or slips can be made into main classes. The keys of the Classicompteur are then blocked off into separate groups, as for instance, a given number of keys may be reserved for nationality, another set for profession, another for age, etc. The information is then recorded by merely depressing the keys, and when all the information contained on one card or slip has been transferred to the tabulator, a lever on the right hand side of the machine is depressed, thereby releasing the keys and causing the numbering machine to advance one point. When a tabulation is completed for a certain section, a movable frame is brought down over the keys and an impression obtained of the record on the paper that is wound round the rollers. The machine has an attachment for controlling the work done by the operators, which registers the number of sheets that have been read. This checking device consists of a roll of paper that is automatically perforated at the time the lever is depressed. The perforations for a given record appear in a straight line, and to check this the perforations are passed through an apparatus devised for the purpose, in front of a scale rule which is marked off to correspond with the readings required. The perforations appearing at the edge of the scale rule can then be examined and translated into their proper meaning; and in this way any given batch of cards can be analysed and the work duly checked.

The machine presents the great advantage that the results are obtained by one handling of the cards, and that once the information is recorded on the tabulator, it is automatically printed on the sheets, thereby avoiding all errors of transcription. The work is done with great ease and rapidity, and an expert girl can transcribe 1,200 slips an hour after a few weeks' work, and from 1,500 to 2,000 per hour at the end of a few months. It is possible to correct any mistake before the lever is depressed. For statistics requiring a great number of entries two or three machines can be used at the same time.

The Tate Improved Arithmometer, 1903 Patent. (*Mr. J. H. Steward, 406, Strand, W.C., and 447, West Strand, W.C.*)

This machine is of a well-known pattern. The multiplicand is set by moving indices in the nine slots on the fixed plate. A lever fixed on the left has to be set to indicate multiplication or division: on the right are the driving handle and a lever for clearing products and quotients. The machine is made in two sizes, for 16 figure and 20 figure products respectively.

Layton's Improved Arithmometer, 1911. (*Messrs. C. and E. Layton, 56, Farringdon Street, E.C.*)

This machine is based on the Tate Arithmometer, 1908 model, which is still manufactured by Messrs. Layton, but several improvements have been made therein. The regulator can be controlled by the right hand or foot, as well as by the left hand as hitherto. The markers can be cleared to zero simultaneously by means of a button, and the figures of the multiplicand are indicated in show holes, as well as by the markers. Sliding pointers show the decimal point in lieu of the pegs formerly employed. A foot treadle can be supplied for moving the slide, so as to free the left hand for attending to the regulator.

The "Millionaire" Calculating Machine. (*Constructed by O. Steiger, Zurich. Lent by the Prudential Assurance Company.*)

For addition, subtraction, multiplication or division. When set at multiplication or division, the "Millionaire" acts as a true multiplying machine, one turn of the handle only being necessary to effect the multiplication by any digit (1 to 9) of the number set up on the sliding markers. During the turn of the handle the product slide moves automatically one place to the left into position for the multiplication by the next figure (of lower order). It will be observed that the multiplication by any digit is effected in two stages. Thus if 8 fives are set up by the sliding markers and the left-hand indicator placed at five, the first portion of the turn of the handle brings up 8 twos on the slide; then, as the handle continues to turn, the slide moves one place to the left and 8 fives appear, being added on to the twos already on the slide, in proper sequence, with the exception of the five at the extreme right. The machine, in fact, has collated the results of eight multiplications of 5 by 5, the tens appearing first and then the units. Division is the reverse of multiplication. The machine may be made to act precisely like the "Thomas" type of arithmometer by setting the left-hand indicator at 1 and the right-hand indicator at addition (for multiplication) or at subtraction for division, and then turning the handle as many times as is necessary for each digit of the multiplier (or quotient). In this position the slide does not move automatically.

T.I.M. ("Time is Money") Machine. (*Constructed by Ludwig Spitz and Co., Berlin. Lent by the Prudential Assurance Company.*)

This is a modification of the "Thomas" Arithmometer. Built up on a solid metal base without any wooden casing, it is stronger and more silent in working than the usual models. Several minor improvements have been effected, tending to greater smoothness and accuracy of working, notably a locking arrangement of the carrying mechanism, which also is provided with an improved type of spring. The makers claim that the form of bevel they have adopted prevents any tendency to jump the slide. Any of the series of figure results may be brought to zeros by one pressure on a lever.

Brunsviga Type Calculator. (*Designed by Strasser and Rohde. Manufactured by W. F. Stanley and Co.*, 4 *and* 5, *Great Turnstile, High Holborn, W.C. Lent by Mr. S. Rosenbaum.*)

For multiplication, division, addition, or subtraction. Gives results to *sixteen* figures. Specially adapted for actuarial work, and for a series of arithmetical operations involving common multiplier or common divisor.

The Brunsviga Calculating Machines. (*Messrs. Grimme, Natalis and Co. British Agency: W. H. Colt, Hornsby House*, 75B, *Queen Victoria Street, E.C.*)

The Brunsviga Calculating Machine developed from the Odhner multiplying, dividing, adding and subtracting engine, license to work which was acquired by Messrs. Grimme, Natalis & Company, Brunswick.

In the early design the levers were not locked when in use, but this is now done. The reverse movement is made by merely turning the handle in the opposite direction. Overturns can be corrected. The carriage slides on runners and is not lifted.

(*a*) The Standard Model.

This, with the exception of the Miniature Brunsviga, is the lightest model. It is built, as are most models, in at least two capacities :—The A capacity with 18 product holes, 10 quotient holes, 9 levers; the B capacity with 13 product holes, 8 quotient holes, 9 levers.

(*b*) The Miniature Standard.

A replica of the Standard type in miniature. It is one-third of the size, and weighs only 7½ lbs. This little machine is noiseless.

(*c*) The New Model J.

This machine has lengthened ivory setting levers to facilitate speed in setting, and registers brought into line of sight. In the third register the figures appear simultaneously as they are set up. The setting locks at beginning of operation. As a development of this design —in a model styled "H"—the second multiplier was introduced to act in two ways, one to show in white figures always the exact meaning of a shortened multiplier, and, when desired, to allow of the multipliers being added together automatically, while still giving a separate register for the check of each multiplier being added in.

(*d*) The N Model.—Continued Multiplication Type.

In order to save the re-setting of figures, a product can be automatically thrown up on the figure plate of the N. model for further multiplication—as in the case of raising figures to any desired power, etc. In this machine the visibility register is at the top of the case.

(*e*) The Arithmotype.—Recording Calculator.

It is claimed that this is the first machine to record multiplications and divisions as well as addition and subtractions on paper. Printing is automatic and simultaneous with the working of the machine. Either the factors only or operation in detail can be shown, and if desired the printing mechanism can be shut off entirely. Like Model N, the Arithmotype automatically transfers products to the figure plate for further multiplications.

No. 1 Elliot-Fisher Writing-Adding Machine. (*The Elliot-Fisher Writing-Adding Machines,* 75, *Cannon Street, E.C.*)

This machine has a flat platen in place of the cylindrical one common to the ordinary form of typewriter, and by means of this flat platen it is a simple matter to write direct into an ordinary bound book. It will manifold up to 20 copies at one operation, giving the information required on each copy, and will add in sterling or decimal currency, weights and measures, yards, feet, and inches, etc., etc., as may be necessary, the figures being automatically added up as they are written in the ordinary way with the machine.

No. 2 24-inch Machine.

This possesses precisely the same qualities as No. 1 except that the machine on show will not be designed for writing into bound books, although it may be obtained for that purpose. It is being exhibited on account of its usefulness for statistical purposes, as it will add in any number of columns up to 22. The machine on exhibition shows additions being made in twelve columns, the registers being of varying capacities up to eight figures in the pounds.

The Remington-Wahl Typewriter Adding Machine. (*Remington Typewriter Company,* 100, *Gracechurch Street, E.C.*)

It is claimed for this machine that it is the first practical machine constructed to write, add, and subtract. It is controlled by eleven numeral keys only, and the ordinary typewriter keyboard. The machine checks its own additions and subtractions, as well as the operator's copying of the figures, thus limiting liability to error. When the totals are written the machine clears automatically and is ready for the next work.

The Burroughs Adding and Listing Machines. (*Burroughs Adding Machine, Limited, Cannon Street, E.C.*)

(*a*) Nine-Column Burroughs Duplex Machine, with ordinary 12¼-inch Paper Carriage.

This machine is capable of carrying two separate and distinct lists of a maximum capacity of £999,999 19*s.* 11*d*

The two sets of accumulators are under the control of the operator, and the position of a small lever (which has only two positions—upper and lower), determines in which of the two the amount represented by the keys depressed will be accumulated. The total which has been accumulated on either of these adding counters is printed, as on every other Burroughs machine, by simply depressing the total key and pulling the handle. Designating symbols are automatically printed opposite these totals to show which was listed on the upper and which on the lower counter. The machine is so arranged that a list of items may be accumulated on one counter, and automatically transferred to the other. Thus several totals of independent lists can be carried forward, and their grand total obtained at any time.

(*b*) Burroughs No. 6 Electric.

This machine is the smallest model of the Burroughs. It is made for speed and for use where large maximum totals are not required. It has a listing capacity from $\frac{1}{4}$*d.* up to £99 19*s.* 11$\frac{3}{4}$*d.*, and a totalling capacity from $\frac{1}{4}$*d.* up to £999 19*s.* 11$\frac{3}{4}$*d.* This machine is used in restaurants and in similar businesses where speed in adding up sales dockets and so on is mainly desired. Like all latest pattern Burroughs machines this is equipped with keys which enable the operator to list an amount without adding it, to repeat the listing and adding of an item as many times as required, with the key for printing a carry-forward total, etc.

(*c*) Fifteen-Column Burroughs Adding Machine, with Controllable "Splitting" Device.

This machine is equipped with the device which allows the keyboard to be divided into several different sections, and with a variety of capacities in each section. When so divided, any section can be made additive or non-additive—that is, should one or more of the sections be used for numbers, a total of such section or sections might not be wanted. To bring into operation the different sets of "splits" or divisions of the machine, it is only necessary to move a little indicator, which on this machine has six positions. By the use of this machine several separate columns of figures may be listed and added at one operation. For instance, in making out a wages sheet, the machine will list the number of hours, rate and amount at one operation, and when required will automatically give the total of hours and amounts columns.

The Comptometer. (*Felt and Tarrant Manufacturing Company, Bank Buildings, Kingsway, W.C.*)

The Comptometer is an adding machine upon which it is practical to multiply, divide, and subtract. It is claimed that it is twice as fast as any other adding machine, and also the fastest multiplying and dividing machine. It is key operated, like a typewriter. Each key top bears two numbers: the large figure is for addition and multiplication, and the small figure (co-digit) indicates the power of that key for subtraction and division. Comptometers are arranged for both decimal and £ *s. d.* currency. In the latter, the pounds columns being decimal, this style in reality combines the £ *s. d.* and decimal machines, making it possible not only to add amounts in sterling, but to make all computations in decimals as well. The Comptometer is light, compact, and noiseless.

Professor Selling's Calculating Machine. (*Constructed by Max Ott, Munich. Lent by Professor Henrici, F.R.S.*)

This machine differs widely from other calculators by its use of a "lazy tongs" mechanism resembling the lift-gate on a tube railway for obtaining the partial products. As such a gate opens and the first vertical bar moves through a distance of, say, 1 inch, the second vertical bar moves through 2 inches, the third through 3 inches, and so on. The distance moved through by any vertical bar on the gate, is, in fact, proportional (1) to the distance through which the gate is opened (the multiplier), and (2) the number of the bar, counting from the fixed one (the multiplicand). In the machine, a number of parallel racks are provided, each of which can be coupled to any one of the bars of the gate (which is laid horizontally) by depressing the corresponding key on the key-board, and these racks transmit the movement to the recording wheels. The carriage of the tens is effected continuously by epicyclic gear.

The Ellis Adding Typewriter. (*The Ellis Adding Typewriter Co., Ltd., Newark, N.J.;* 6, *Lloyd's Avenue, E.C.*)

A new accounting machine which writes statements, accounts, ledgers, trial balances, &c. It adds both the debit and credit columns of figures at the same time, and automatically prints the totals.

Meteorological Statistics, &c. (*Lent by the Meteorological Office.*)

1. For the British Isles.

Monthly maps of Rainfall, Sunshine, Temperature and Pressure for the twelve months of the year 1910, and for the whole year.

2. For the Globe.

Six globes showing the average distribution of (1) pressure and winds; (2) of sea temperature and surface current; (3) of air temperature and humidity for February and August, compiled from observations collected from ships during the years 1854 to 1910.

STATISTICAL DINNER CLUB.

On the evening of June 13 the Statistical Dinner Club entertained at dinner a number of distinguished visitors "on the occasion of the meeting of statisticians of the British Empire at the Imperial Conference." Although the Statistical Dinner Club, which was founded in 1834, is entirely independent of the Royal Statistical Society, it is intimately associated with the Society of which all its members are Fellows. In offering hospitality to those associated with statistical work in other parts of the Empire, the Club felt justified, therefore, in welcoming its guests on behalf of the Society. The dinner was given at the Café Royal, and Lord George Hamilton, President of the Society, was in the chair. Among those present were: Mr. W. M. Acworth (Treasurer of the Club), Professor W. J. Ashley, Mr. Percy Ashley, Sir J. A. Baines, C.S.I., Sir E. W. Brabrook, C.B., Sir Chauncey Cartwright, K.C.M.G. (Foreign Office), Captain Muirhead Collins, C.M.G. (Official Secretary in Great Britain of the Commonwealth of Australia), Mr. A. E. Craddock (Secretary, Department of Agriculture, British Columbia), Major P. G. Craigie, C.B., Mr. Frank Debenham, Dr. Dudfield, Sir George Gibb, Mr. J. F. Green (Colonial Office), Mr. K. G. Gupta, C.S.I. (India Council), Mr. C. Alexander Harris (Colonial Office), Mr. H. E. Haward (Comptroller of the London County Council), Sir W. Hely-Hutchinson, G.C.M.G., Sir T. Holderness, K.C.S.I. (India Office), Mr. H. W. Just, C.B., C.M.G. (Colonial Office), Mr. A. W. Waterlow King, Mr. Bernard Mallet (Registrar-General), Sir R. B. Martin, Bart., Mr. W. L. McKinstry (Chief of Customs, British Honduras), Sir Theodore Morison, K.C.I.E. (India Council), Mr. G. S. Murphy (of Brisbane), Sir Shirley Murphy, F.R.C.S., Dr. Newsholme, Sir Sydney Olivier, K.C.M.G. (Governor of Jamaica), Mr. G. Paish, Sir F. S. Powell, Bart., Sir Lesley Probyn, K.C.V.O., Mr. Arthur Ray (of Vancouver), Mr. R. H. Rew, Mr. C. V. Sale, Dr. W. Saunders, C.M.G. (late Head of Experimental Farms, Canada), Dr. W. N. Shaw, F.R.S., Colonel Shipway, Mr. G. J. Stanley, C.M.G. (Board of Trade), Senator the Hon. Sir Josiah Symon, K.C.M.G. (Australia), and Mr. G. Udny Yule.

The Chairman, in proposing the toast of "The King," said that at the afternoon meeting of the Royal Statistical Society, Sir Athelstane Baines had read a very instructive paper upon the enormous growth and development of the British Empire during the last seventy years, and had shown statistically, as it were, that the connecting link between the different portions of the Empire was the Crown, and that, therefore, the Coronation ceremony which would take place next week was not a mere formality, but a symbol of the tie which bound all portions of the Empire together. There had been no King in their history who was so well qualified to perform those duties as George V. No man had the same practical experience of the great Dominions over the Sea, acquired by personal contact, as had King George, and the impression he had made on all with whom he had come in contact was of a man who deeply felt his responsibilities, and who was thorough in everything he undertook. (Cheers.) The last Coronation of the King of their country was surrounded by all the pomp and ceremony that a great Empire could provide, but the feeling that came home to him was not so much one of admiration of all that pomp and ceremony, as a sense of the grave responsibility which was entailed upon the throned and crowned person. They in their humbler spheres as subjects undertook duties; but age, illness, or many other causes, might induce them to abandon the duties they had undertaken, and others might fulfil them perhaps as satisfactorily as they themselves. But a King, once enthroned, had no rest this side of the grave. Whether he was strong or ill, happy or unhappy, he had to perform his duties in the same way. On the death of Queen Victoria, Mr. Balfour went down to Osborne, and afterwards in the House of Commons gave a most graphic account of the enormous mass of correspondence, of despatches, of red boxes, which after three days of illness had accumulated in the rooms; and Mr. Balfour impressed, he believed, every member of the House with the responsibilities of the Monarch. Surely, no more touching message was ever left to a great industrial nation or Empire, than the last words of their late King, "I will work as long as I can"; and their present Sovereign had been trained in the same traditions. Let them, then, drink his health, hoping that he and his Consort, who was the first Englishwoman who for over three hundred years had been the Consort of their King, would long live and reign over them, confident that their tenure of office would ever be associated with the elevation and unity of the Empire. (Cheers.)

The CHAIRMAN, in proposing the next toast, said that, in accordance with the custom of the Club, he would propose, without comment or response, the toast of "The Royal Statistical Society."

The CHAIRMAN then proposed the toast of the evening, "Our Over-sea Guests." He said they were met in a very notable gathering. He had a list of the guests, which contained a number of most distinguished men who had served, and successfully served, the Crown and country in every phase of work. Turning to his right, there was a distinguished gentleman (Sir W. Hely-Hutchinson) who had done admirable service in the very highest possible capacity in South Africa. Turning in the other direction, he found the Governor of Jamaica, who had done much since it was overcome by earthquake to rehabilitate its fortunes. There was no Department of State, Foreign Office, Colonial Office, India Office, that was not well represented by competent persons; but their object was to give a dinner to their over-sea guests, and he was sure that, however distinguished any member might be who was domiciled in this country, he would not object if on the present occasion the go-by was given to him, and the toast was associated with some well-known name of a guest from over the sea. That large gathering—large in the sense of the importance of the individuals composing it—was due to the importance that everybody attached to statistical research. They were told that statisticians were dull and stupid people, entirely absorbed in abstract theories, and taking no interest in the everyday occupations of life. His friend, Lord Goschen, who certainly was one of the most notable and able statisticians in public life, always vigorously combated that view, and, in a speech made in connection with their Society, he pointed out that a really first-class statistician who understood his business took immeasurably more interest in individuals and persons outside his immediate sphere of work than did a man who was not a statistician. There was an old proverb which he remembered as a boy, and which had always been a great source of help to him : "Vast is the ocean ; vast is a drop of rain." A drop of rain might seem to be nothing, but when one remembered that from these drops of rain all the great rivers, and the sea, were formed, one gained some idea of what combination could do. And that is what statistics taught. Every individual was more or less a unit in some great organisation, and he who recognised that gained an interest which the separate and detached units would never impress upon one. Statistics were becoming more and more important. The tendency all over the world wherever Democracy was supreme was to devote more and more attention to industrial and social legislation. One sometimes heard people say, "This is class legislation" ; but the history of the world taught that whatever class were dominant in the legislature would take very good care that their own interests were looked after. (Laughter.) The landowning class looked very well after themselves when they were dominant in the country. So did the commercial classes ; and they need not wonder that the industrial classes, when they found themselves preponderating, should take the same view of the situation, and should do as others did before them. Therefore, what statisticians should do was to take care that the Democracy did not do itself harm by legislating on wrong lines. That was where the statistician came in. Mr. Goschen, in opposing the reduction of the franchise, gave as his main reason the opinion that there would be legislation of this kind, and said that those who would secure the new franchise detested political economy and loved philanthropy —and philanthropy was not a sound basis on which to base social legislation.

Another great man with whom he had had the honour of coming into contact, who took rather the reverse view of the situation, was Lord Beaconsfield. Speaking to Scotsmen—and Scotsmen were supposed to be always looking after the bawbees—he said: "The aspirations of a great nation cannot be satisfied by the mere rattle of the dry bones of political economy." (Laughter.) Impulse, enthusiasm and sentiment—these were the moving forces by which legislation was carried, and everyone who cared about sound legislation should endeavour to see that such legislation was based on accurate statistical information. (Hear, hear.) There were present a number of distinguished Colonial statesmen, and he would select three names to associate with this toast of "Our Over-sea Guests." The first name was that of the Honourable Sir Josiah Symon, who was a most distinguished Australian Senator. And in order to give some idea of the magnitude of the Empire they had proposed names which made a little triangle in the globe, and showed how large an area was included within that triangle of the British Empire. They started with Australia, then they came to Canada, and he associated with Canada the name of Dr. Saunders, who for many years was the head of a series of agricultural experiments which he believed were most effective. That was the second point of their triangle. The third was India, and he associated with India the name of Mr. Gupta, a member of the India Council, who in that capacity had done excellent work.

On behalf of the Statistical Society, they gave all their over-sea guests a most hearty welcome. They rejoiced at their presence, and took it as a sign that they recognised the value of the work which the Royal Statistical Society were endeavouring to do, and of the principles which underlay their work. Let them, therefore, in drinking this toast, and associating with it those three well-known names, connect it with the principle that all legislation, social and industrial, should in the future be based on sound research and on sound and trustworthy statistics. (Cheers.)

Senator the Honourable Sir JOSIAH SYMON said a great honour had been conferred on the over-sea guests, of whom it was his privilege to be one, by having their health proposed with so much eloquence and kindness. They appreciated that very much, and, personally, he valued it still more because it was accompanied by an authoritative exposition of those high principles of legislation and politics which he himself had put at the foundation of public life, of Parliamentary life, at any rate, for a very long time. He alluded, of course, to that high principle which induced every party and every section to look well after itself. (Laughter.) His experience in Australia had been very much what the Chairman had said—that the "ins" and the "outs" very often represented to a large extent the interests of the particular elements of which they were composed. It was a great honour to have this toast proposed at a gathering of the Fellows of the Royal Statistical Society, who testified to their modesty by proposing their own health, without note or comment, without a single word of just adulation. He had never known an occasion when a toast, which was sometimes summed up as the toast of "Our noble selves," had been proposed with so much self-abnegation as it had been in their case. (Laughter.)

He rejoiced also to have had the opportunity of thanking the Statistical Dinner Club for the honour of their invitation. He regarded it as a very great personal compliment. He did not know what he had done in this world to deserve it. He was no statistician; he had never soared into those empyrean realms of statistics to which the Chairman had so mellifluously referred; but he did agree with what he had said,—that statistics were by no means dull. The profession he followed was the profession of the law, which was, of course, prosaic to a degree; but he had always regarded statistics as the very poetry of things earthly (laughter), and for that reason he had never been able to soar so high. Figures, even in the form of statistics, had been, he confessed it with shame, an absolute abhorrence. But, at the same time, he regarded them as of the greatest possible value, for many of the reasons which had just been intimated to them. However, he liked them to be manipulated by others. (Laughter.) He liked to get the crystallised result, and therefore, always felt indebted to statisticians. They had statisticians in Australia, he could assure them—and most excellent statisticians they were—and they had excellent material to work upon. The prosperity and progress of Australia had in recent years been so marvellous that the panting statistician had toiled after them in vain. (Laughter.) Indeed, he had recently taken refuge in the Census, to which allusion had been made, and which had been so productive of interest and result. They had had a number of returns made by the people of Australia, who were, he could assure them, a long-suffering people. They made a fuss about those returns when they were first laid before Parliament, but they felt quite satisfied that the statisticians of Australia were very desirous that every man and woman should state whether he was a man or a woman, and therefore their returns had two columns, which had to be filled in—one headed "Male," and one headed "Female"; and every man and every woman had to put in the proper column the sex to which he or she belonged. (Laughter.)

He had been greatly struck with the remark which had just been made as to the occasion that had brought them to the centre of their Empire—the Coronation of the King. It was true, as had been just remarked, that George V enjoyed an entirely unique experience when he ascended the Throne, an experience which would be of the utmost value to him as the Sovereign of those realms—that of visiting some of the most important and most striking and most prosperous parts of the Empire. They in Australia looked back with pride and satisfaction, and affectionate loyalty, to the visit which he and his Queen paid them ten years ago. It was a memorable occasion, and he hoped it would not be considered that he was overstepping the bounds of what ought to be said on an occasion like that, or that he was introducing what are sometimes called party politics, for nothing of that sort was in his mind; while he disagreed with many of the things that were more or less artificial as bonds to unite the various parts of the Empire together, he believed that such visits as the present King and Queen paid, as the Duke and Duchess of Cornwall and York, were powerful cementing influences throughout their vast Empire. George V was as much a personal king to them in Australia as he was to those in the heart of London. The Empire was really beyond adequate conception—beyond even the beauty and the power and the resources of the English language—and nothing struck him more as illustrative of the extent and the real Imperial character of their

Empire than to find himself on board the P. and O. steamer with fellow passengers from various other parts of the Empire—potentates, Mahommedans from India, Sultans from the Malay States, and the Prince of Abyssinia, accompanied by the Mission which was to bring the good wishes of Abyssinia and lay them at the feet of the Throne. To his mind it was very striking. Parthians, Medes, and Elamites from the utmost ends of the earth approached this little isle set in the silver sea to do honour to that great occasion. One of his fellow passengers was a highly-distinguished Indian nobleman, and nothing could be more touching than when he wrote in a book, of the kind which did duty on these voyages for recording the autographs of distinguished travellers, his name, and underneath it that motto of his, "Allegiance and faithfulness to the Sovereign are worth a hundred of the best things of the earth." With a spirit like that animating their fellow subjects in that great Empire—for India was an Empire of itself—and animating them in other parts of the Empire besides the self-governing dominions, there was no fear for the British Empire for many years to come. Australia was inspired by a loyalty quite as deep and as vigorous as that expressed in that motto. It was 13,000 miles away, but it was none the less closely identified with the interests of every part of the Empire, and they must not take the casual expressions sometimes recorded as having taken place in debates in Parliament and on platforms as showing anything at all to the contrary. Men were not always quite responsible for the things that they said. The tongue, as they were told, was an "unruly member," and even politicians were not always perfectly on their guard; and, brushing such observations on one side, there was not the slightest shadow of doubt as to the loyalty of Australia and of her determination to remain, if the Mother Country would still allow her to remain, a part of that great Empire. (Cheers.)

He rejoiced that in addition to having been invited to that gathering he had had the distinguished honour of being photographed in the company of Fellows of the Royal Statistical Society. He could assure them that he would regard that as one of the great permanent facts of his life. (Laughter.) The only thing he was afraid of was that when his friends saw that photograph they would say, "Is Saul also among the prophets?"; but he would tell them that this was one of the most delightful evenings he had ever spent. They had come from over the seas, he was going to say like prodigal sons, and this not exactly because they had "spent their substance in riotous living in a far country," but prodigal sons in the sense that the father always killed the fatted calf. In fact, there was too much fatted calf. (Laughter.) The hospitality they received was so great that it almost outran the robust capacity which they in Australia enjoyed for banquets and the good things of this life. But the friends round the table and those included in the over-sea guests would allow him to say that they were most grateful, that they thanked them heartily for their hospitality, and for the eloquent and kindly terms in which their health had been proposed. (Cheers.)

Dr. W. Saunders said it gave him very great pleasure to be present, and to have the honour of being invited as one of the oversea guests to that distinguished gathering. He was pleased that the Chairman had united Canada with Australia and with India, because there were many matters in which they could help each other. And indeed they had done a good deal to help each other, especially as to agricultural progress, which was not very generally known. He was not a statistician, although he had done something to help forward the good cause in Canada—but his attention had been mainly given to the improvement of the agriculture of that country. (Hear, hear.) The subject was so full of detail that it would be impossible to give even a sketch of the whole of the work done in Canada within the past twenty-five years in promoting the advancement of agriculture, and in making Canada better known commercially and agriculturally, as well as for the loyalty that the people of Canada always manifested towards the Empire. Twenty-five years ago Canada was in a rather impoverished condition, and the conditions of agriculture were so difficult that a Commission was appointed to enquire as to the best way of escaping from the difficulties which beset them on every hand. Farmers had no one to whom they could appeal for information. They were an aggregation of individuals who had been brought from all lines of life, and they had to put up with lack of information in every direction. The Government decided to establish experimental farms to instruct farmers in the best methods —indeed to make each farm a bureau of information, to which farmers could apply at all times, in the straits in which they were placed sometimes through lack of experience, and could gain such information as would be useful to them and would make their occupation more profitable. Five farms were established; one at the Capital, one in the Maritime Province, one in Manitoba, one in the North-West Territory, and one in British Columbia. The rapid increase of the correspondence showed how the farmers tried their best to get all possible good out of the institutions that had been established for their welfare. At the end of the second year the correspondence with the farms amounted to about 8,000 letters; while in the last two or three years the correspondence has reached to over 100,000.

Another important matter arose with regard to the growing of wheat in Canada. In the early history of the country the wheat grown was largely "red Fife," known more usually as "Manitoba hard." It made flour of the very best quality. But there was a difficulty in growing red Fife in some parts of the country, owing to the shortness of the season, and the frost would sometimes injure it before it was fully ripe. The experimental farms applied themselves to the problem of finding a wheat which would be as hardy as the red Fife; that would be as prolific and as good in quality, and at the same time would ripen a week or two weeks earlier. The earliness of ripening of a grain could not be secured by any known scientific process. It could not be reached by discovering means chemical or otherwise which would give to the grain that property of earliness. The result must be naturally produced through a long course of circumstances favourable to the earlier ripening of the grain; and the existence of early ripening varieties had been discovered in many sections of the globe. During the reign of Lord Dufferin he interested himself in Canadian agriculture to a considerable extent, and he had had samples of grain collected at different altitudes in the Himalaya Mountains, as well as on the plains of India, where two crops were raised each year, and in both of those instances he furnished the Canadian farms with samples of grain which ripened from a week to ten days earlier than the varieties of grain that were then growing in Canada. That was a great point gained. They held on to that earliness in the maturing of the variety, and, by careful breeding and the infusion of the quality of prolificness, they had succeeded in the last eight or ten years in introducing varieties that were equal in quality in every respect to the best of those that had been previously cultivated, and were about two weeks earlier. That was an enormous gain; and one variety now known as the "Marquis" was being cultivated most rapidly all over Canada, and had been ripened as far North as Fort Chipewyan on the Peace River, 400 miles in a direct line north of Edmonton, showing that there was an enormous area in which could be grown this early-maturing variety of wheat, for which they were indebted to India. Thus about 11,000 feet up the Himalayas they succeeded in procuring a variety which had since given birth to what was known as the "Marquis." Indian wheats, while they had the quality of earliness, lacked productiveness, and they also lacked, to some extent, quality. Between the wheat grown near Calcutta, known as "hard red Calcutta," and another one obtained in the upper portions of the Himalaya Mountains, they found the difference in the time of ripening was so marked that the outcome was that about two weeks time had been gained, and there were many hundreds of thousands of acres of land in Canada on which this wheat could be grown and matured, while the varieties which had been cultivated before would not have succeeded.

The question was often asked, "When you get a variety of wheat of that sort, how do you distribute the wheat among your farmers, and get them supplied with it?" The Government had given free transportation from the experimental farms when sending samples of wheat to farmers, up to 5 lbs. samples to every Post Office in the Dominion, and every farmer who wanted a sample of the new variety to test on his farm wrote to the experimental farm, and it was sent to him free within a short time after his application was made. In that way, 40,000 samples had been sent out each year to farmers in all parts of the Dominion, and it was astonishing to see how soon a variety became known over the whole country. Those instances would give some idea of the care and patience with which they were striving to improve agriculture in Canada. Canada was a country of great possibilities, particularly with regard to the production of food for man. They wished so to develop Canada that it would in a short time be able to supply the Mother Country with all the wheat that it required, and he had no doubt it could be done. In Saskatchewan and Alberta alone, they had 300 million acres of land, a large part of which was suitable for wheat growing. The Canadian people were loyal and law-abiding; and as they thought a great deal of the good King that reigned over the Empire, he fully appreciated and heartily concurred in what the previous speakers had said about the importance of the King visiting the over-sea dominions from time to time. His last visit with the present Queen endeared him to the hearts of the people, and created a sentiment of loyalty that would never be effaced. (Cheers.)

Mr. K. G. GUPTA said he greatly appreciated the privilege of joining with other over-sea guests in expressing his keen appreciation of the great honour that the Statistical Dinner Club had done them by inviting them as their guests, and he wished to express personally the great pleasure he had in coming to their gathering. At the same time he could not help feeling that it was rather odd that he should be called upon to open his lips before members of such a learned Society. It was odd because the Hindus for over three thousand years had looked upon figures and statistics with what they regarded as justifiable contempt. (Laughter.) They were a spiritual race: they regarded everything of this world as a mere illusion, and therefore facts and figures connected with the life history of nations were matters of no concern to them. However, contact and impact with great and vigorous minds from these islands who had visited their shores—an illustrious example was his friend, Sir Athelstane Baines—had broken their slumbers and shaken their reverie—(laughter)—and they had come to realise that, in order to keep pace with the progress of the world, they must also pay some regard to material facts, and that it would not do merely to deal with what were regarded as spiritual things. As the result of this the people of India had done very fair work of recent years in the field of statistics. In the matter of the Census he thought they had particular reason to be proud. If they considered the vast area of India, with its population of over 300,000,000, it would certainly interest them to know that the last Census figures for India were published to the world within nine days of the taking of the Census, and they would be surprised to learn that the pivot upon which the statistical wheel moved in India was the village watchman with a salary of 5*s.* a month! It was he who furnished all the figures and statistics as to births, deaths and everything else; and it was marvellous, having regard to the accuracy of the information. So that in recent years they had done their best to make up for the apathy that they had shown towards figures in the previous three thousand years of their existence, and he hoped that in course of time they, as Indians, would take their place among the great body of statisticians. (Hear, hear.)

The distinguished representative of Australia had very properly referred to the feeling of loyalty that this great nation had evoked in the centre of the Empire and also all over the Empire. And, after all, when they talked of the British Empire even Colonials would recognise that without India the British Empire would be nowhere. Without India the British Empire would be like the play of Hamlet with Hamlet left out. (Laughter.) And it was probably this consideration that induced their Sovereign to pay the first visit immediately after his coronation to India. The people of India were looking forward with the greatest expectation to that visit, and he had not the slightest doubt that when their Majesties visited India the feeling of loyalty evoked, and the expression of allegiance to their Person and Throne that would be shown by the people of India, would surpass all expectations. He joined therefore in wishing that this great visit would be a success, and that it would tend still further to cement the bond of union which should unite all parts of the Empire. (Cheers.)

The CHAIRMAN said he would ask Major Craigie, the father of the Club, to propose the next toast, "Statisticians of the Empire."

Major CRAIGIE said it was with very great pleasure that he responded to the invitation of the President to propose the last toast on their list; and as the senior member of the Statistical Dinner Club, which was a centre within a centre, he begged to propose for their acceptance the toast of the Statisticians of the Empire. In that toast were included an immense variety of workers whom they welcomed in comradeship. Working in the centre of this little island, they could do but little to evolve the great facts on which the future of the legislation of the Empire depended. They must rely upon the men upon the spot for statistical work as well as for administration. As an old worker in the field of statistics, he fully recognised that, and he would desire very humbly to re-echo what the President had said as to the fundamental work of the statistician in the government of men. Without facts they were unable to direct their policies or their legislation to any practical advantage. And it was the duty of the statistician, in however remote a part of the Empire he might be, to discover and collate the facts, and to lay them before the responsible government of his country before any proper measures for the social development of those great communities could be properly considered. It was a matter of happy augury that there were united around that table the West and the East. They had the new countries, for which his friend, Dr. Saunders, had spoken, with their great problems of development and the agricultural potentialities of their soil. They had the great territories and the vast populations of the East, for which Mr. Gupta had so eloquently responded, to add to their knowledge important facts as to the growth of the great masses of the population of the British Empire.

No one could have listened to the eloquent address which his colleague, Sir Athelstane Baines, had given that afternoon without learning what was at the basis of all statistics. They must first ascertain the facts as to the population, and secondly as to the area, and thirdly they must collate and bring together a knowledge of facts as to transport and the trade of the Empire between the different elements of which it was composed. Those three elements were the chief factors of statistical work—population, land and trade. He regretted that they had not present with them many of the eminent statisticians of the more distant parts of the Empire. There was a very good reason, however, for their absence. They were engaged in what was after all the greatest work of statisticians —the compilation and the finishing of the decennial census of the Empire.

He welcomed that as an index of how the minds of their varied populations, Eastern as well as Western, had awakened to the fact that the numbering of the men of the Empire was the first duty of the statistician; and he had no doubt they would grant those gentlemen leave of absence, and excuse them for not replying to the toast which he had the honour to propose, because of the local necessities of the work upon which they were at that moment engaged. All were interested in knowing, more than at any time in their history, whence would come the supplies of food for the millions of population that were reckoned by no census table; and they were also interested in knowing what were the channels by which the food supplies would reach them, and what were the methods by which the Empire as a whole might be strengthened. Canada had immense areas, and he had had the opportunity in very recent years, largely under the guidance of his friend Dr. Saunders, of seeing what had there been done to provide for the wants of the Empire. India had potentialities which many scarcely recognised, but which were yet to be established, and there would be work for the statistician in providing that knowledge. Australia, a great Continent entirely under the British Flag, had a future which perhaps not one man in ten had yet recognised. Dr. Saunders had spoken in very eloquent terms of what could be done in the matter of wheat, and he was afraid that in their densely packed island they would have to rely very largely upon the production of meat from their Australian Dominions, without which they would find their dinner table wanting in many of its essential constituents. So without further words, and assured that he might reckon upon the support of all his fellow statisticians, he would ask them to drink the health of the hewers of wood and the drawers of water for the politicians or the economists or the controversialists of the Empire—the health of those who established the veritable facts on which the foundation of their great Empire rests. He was afraid that some of their guests who were to have responded were at the last moment unable to be present, but he would couple with the toast the name of Mr. Craddock, who from the western side of Canada was at the present moment engaged in most interesting statistical work in British Columbia. (Cheers.)

Mr. A. E. Craddock, in responding, said he felt rather diffident in venturing to express opinions before that assembly. In connection with the work in which he was at present engaged, it was generally known that the wise men came from the East —(laughter)—and instead of asking Mahomet to come to the mountain, he was sent here to seek information from the authorities at home in regard to the system that was at present in operation in the work of collecting and collating statistics, more especially those appertaining to the agricultural resources of the Empire. In British Columbia, where he was living at present, and with which he was now associated, the Provincial Government was desirous of framing a system for the collecting of agricultural statistics. That would enable them to go fully and in detail into the resources of the various localities throughout the province. It was a great task, he could assure them, and when they realised that the province was about 750 miles long and 400 miles wide, and that it extended from the 49th parallel with a coast line of 450 miles, they would realise that their work in collecting such statistics would be a great one. He had no doubt that he would obtain from the Home Government and from other sources information which would be of great help towards forming a scheme under which agricultural statistics would be procured regarding the development of British Columbia. (Cheers.)

Sir W. HELY-HUTCHINSON said he had a proposal to make which he was sure was based on accurate statistical information. Lord George Hamilton was worthy of their hearty thanks and appreciation for the manner in which he had presided over their gathering, and he asked them to join with him in drinking his health, and to thank him for presiding that evening with so much tact and so much eloquence—eloquence illustrated, he might say, with mellifluous period and ornamental phrase. (Cheers.)

The CHAIRMAN, in responding, said that early in his life he had visited certain Colonies, and he had never forgotten the kindly reception and the unlimited hospitality that he had everywhere received. He had always, therefore, felt it a point of honour whenever any distinguished Colonial guests came from over the sea to do his best in some sense to reciprocate the hospitality which he had in the early part of his life received. He was very glad that those present appreciated the reception they wished to accord to them, and he sincerely hoped that the results of their gathering might be a real impetus to accurate research and the glorification of statistical work. (Cheers.)

REPORT OF THE COUNCIL

For the FINANCIAL YEAR *ended December* 31, 1910, *and for the* SESSIONAL YEAR *ending June* 15, 1911, *presented at the* SEVENTY-SEVENTH ANNUAL GENERAL MEETING *of the* ROYAL STATISTICAL SOCIETY, *held at the Society's Rooms*, 9, *Adelphi Terrace, Strand, London, W.C., on June* 15, 1911.

THE Council have the honour to submit their Seventy-seventh Annual Report.

The roll of Fellows on December 31 last, as compared with the average of the previous ten years, was as follows :—

Particulars.	1910.	Average of the previous Ten Years.
Number of Fellows on December 31	845	899
Life Fellows included in the above	172	175
Number lost by death, withdrawal, or default	37	56
New Fellows elected	57	49

Since January 1 last, 48 new Fellows have been elected, and the Society has lost 31 by death, resignation, or default, so that the number on the list, excluding Honorary Fellows, on June 15, 1911, is 862.

After a continuous decrease in the number of Fellows during the last six years, it is satisfactory to note that there is a substantial increase over the previous year.

The Society has to deplore the deaths since June last year of the following Honorary Fellows: Mr. George Johnson (Canada) and Don Manuel F. Leal (Mexico), and of the undermentioned Fellows:—

		Date of Election.
	*Airedale, Rt. Hon. Lord	1888
	Anning, Edward J.	1884
c d p	*Dilke, Rt. Hon. Sir Charles W., Bart.	1866
c d p	Galton, Sir Francis, D.C.L., F.R.S.	1860
d p	Harris, William J.	1882
	Howarth, William	1890
	*Kennedy, Pitt	1901
	Macrosty, Alexander	1882
d	Nightingale, Miss Florence, O.M.	1858
d	Platt-Higgins, Frederick	1895
	Scotter, Sir Charles, Bart.	1888
c p	Wolverhampton, Rt. Hon. Lord, G.C.S.I.	1899

* Life Fellow.
c Ex-Member of the Council.
d Donor to the Library.
p Contributed Papers to the Society's Transactions.

By the death of Sir Francis Galton the Society lost a most distinguished statistician, who had been on its roll of Fellows since 1860. He served on the Council from 1869 to 1879, and became a Vice-President in 1875. He made several contributions to the Society's Transactions in the JOURNAL, and an account of his eminent services to the cause of statistical science appeared in the February number of the JOURNAL.

Sir Charles Dilke, who died on January 26, 1911, joined the Society in 1866, was elected a member of Council in 1869, and was President from 1907 to 1909. He read several Papers before the Society, and took an active interest in its Proceedings. During his term of Presidency, he strongly advocated in the House of Commons improvements in the arrangements for collecting and publishing official statistics, and gave valuable support to the views of the Society with regard to the Census, and especially to its repeated demand for a quinquennial Census.

Since June, 1910, the following new Fellows have been elected:—

Barker, G. P., B.A.
Blue, John.
Boag, Harold, A.I.A.
Bobart, H. H.
Bruce, A. B.
Butler, H. W.
Butler, Thomas.
Callie, J. W. S.
Campbell, A. R.
Cassel, F., K.C., M.P.
Christian, E. A.
Coats, R. H., B.A.
Cook, A. J., A.I.A., M.I.I.
Corbett, A. C., M.P.
Cory, Sir Clifford J., Bart., M.P.
Crowe, E. T. F.
Cunningham, G. H.
Dalton, H.
Dunbar, A.
Edwardes, S.
Eve, H. Trustram.
Fraser, D. D.
Frewen, Moreton, M.P.
Garnsey, G. F.
Goldman, C. S., M.P.
Gough, The Rt. Hon. Viscount, K.C.V.O.
Griffin, G. H.
Griffin, H. H., M.J.I.
Gupta, S. D., M.A.
Hamer, W. H., M.D., F.R.C.P.
Hammond, H. P.
Hatch, Sir Ernest F. G., Bart.
Heaton, H. H., B.A.
Hicks, J. C.
Higham, J. S., M.P.
Hincke, R. D.
Howard, H. F.
Hurst, T. J. P.
Joicey, Rt. Hon. Lord.
Leask, P., M.A.
Lee-Nash, W.
Leslie, Robert.
Malachowski, N. J.
Martin, The Hon. Joseph, M.P.
Mason, J. F., M.P.
Maxwell, Arthur.
Maynard, G. D.
Maynard, H. R.
Monckton, H. Percy.
Mond, Sir A. M., Bart., M.P.
Monkswell, The Rt. Hon. Lord.
Mortara, G.
Mukherji, P. N., M.A.
Oke, A. W., B.A., L.L.M.
Osborne, R. Stanley.
Peake, E. G.
Pepper, James.
Price-Williams, R.
Rowland, John.
Russell, Hon. Francis A. R.
Saunders, A. M. C., B.A. (Oxon.).
Slough, W. H.
Spain, F. G. L.
Speyer, The Right Hon. Sir Edgar, Bart.
Stamp, J. C.
Stiles, Clement R.
Towler, W. G.
Trachtenberg, M. I., B.A.
Viereck, J.
Wandsworth, The Rt. Hon. Lord.
Webb, C. M.
Wellington, His Grace The Duke of, G.C.V.O., K.G.
Williams, T. T., B.A.
Willington, W. A.
Young, Prof. A. A.

The following Honorary Fellows have also been elected:—Dr. Robert Meyer (Austria), M. Lucien March (France), Djavid Bey (Turkey), and the President (for the time being) of the American Statistical Association.

The financial condition of the Society is shown in the Auditors' Report appended hereto, the value of the invested stock held by the Society being taken at current prices. On January 1, 1910, there was a balance from 1909 of 152*l*. 10*s*. 7*d*. The receipts of the year were 2,746*l*., including 500*l*. from sale of Consols and 68*l*., income tax refunded, and the expenditure was 2,726*l*., including 436*l*. spent on the redecoration of the premises, installing the electric light, and on furniture and linoleum. In order to defray this unusual expenditure the Council decided to sell Consols (Guy Bequest) to the value of 500*l*., a sum which is less than the interest which has accumulated on the original capital. It should be added that in addition to obtaining the refund of income tax already noted, the assessment of the Society in respect of Income Tax and Inhabited House Duty has been reduced from 429*l*. to 380*l*. Details for the last twenty-five years are given in Appendix B. It will be seen that as a result of the rearrangement of the Society's house, and in other respects also, the financial position of the Society during the past year has been exceptional. The cordial thanks of the Council have been tendered to the Auditors for their honorary services.

The contributions to the Society's transactions presented at the Ordinary Meetings of the Session, 1910-11, have been as follows:—

1910.	
I.—November 15	Hamilton, Rt. Hon. Lord George, G.C.S.I. A Statistical Survey of the Problems of Pauperism.
II.—December 20	Paish, George. Great Britain's Capital Investments in Individual Colonial and Foreign Countries.
1911.	
III.—January 17	Julin, M. Armand. The Economic Progress of Belgium, from 1880 to 1908.
IV.—February 21	Greenwood, Major, M.R.C.S., and Candy, R. H. The Fatality of Fractures of the Lower Extremity and of Lobar Pneumonia. A Study of Mortality Rates, 1751-1901.
V.—March 21	Sale, Charles V. Some Statistics of Japan.
VI.—April 25	Snow, E. C., M.A. The Application of the Method of Multiple Correlation to the Estimation of Post-Censal Populations.
VII.—May 16	Vigor, H. D., B.Sc. On the Use of the "Normal Crop" as a Standard in Crop Reports.
	Popplewell, Frank, B.Sc. Seasonal Fluctuations in Employment in the Gas Industry.
VIII.—June 13	Baines, Sir J. A., C.S.I. Under the Crown.

The thanks of the Society are due to those Fellows who have contributed so largely by the reading of papers to the maintenance of public interest in the Society's proceedings.

The growth of the Society's Library, and the extent to which it is used by Fellows of the Society and others, are shown in Appendix C. The monthly average number of books lent during the sessional year 1909-10 was 100, and that of borrowers 48. The total number of Fellows and others using the Library during the sessional year was 1,147, or an average of 95 persons per month.

The work of the Special (Housing and Development) Committee having been completed, the Council have appointed a House Committee to take over the general care of the arrangements for the convenience of Fellows. The Committee presented a Report in January, as the result of which W. H. Herbert, the Society's messenger and housekeeper, has been superannuated, after thirty-one years' faithful service, and A. G. Marshall has been appointed in his place. In view of the more adequate service now at the command of the Society, arrangements have been made for the serving of tea in a smoking room opened for the convenience of Fellows.

The Council have appointed a Special Committee on Infantile Mortality to "inquire into the systems adopted in different countries "for the registration of births (including still-births) and deaths "with reference to infantile mortality, and to report to the "Council."

Under the conditions laid down in the regulations for the award of the Guy Medal, the Council have awarded a Guy Medal in gold to Mr. G. Udny Yule for his extraordinary services to statistical science, for his valuable contributions to the transactions of the Society, and for the special work done by him in the interests of the Society.

In view of the arrangements which were made for the Coronation, it was decided by the Council to alter the date of the June Ordinary Meeting from June 20 to June 13. At this meeting, which was held at 5.30 p.m., at the Rooms of the Royal Society of Arts, Sir J. A. Baines, C.S.I., Honorary Vice-President, read a short Paper entitled "Under the Crown." On the same day, at 4 p.m., the President and the Council and Officers of the Society were "At Home" to Fellows and their friends at the Society's House. A display of calculating machines and other mechanical appliances of interest to those engaged in statistical work was arranged for the occasion.

The following Fellows (nominated in accordance with By-law 14) are recommended for election as President, Council, and Officers of the Society for the Session 1911-12:—

PRESIDENT.

The Right Hon. Lord George Hamilton, G.C.S.I.

COUNCIL.

*William M. Acworth, M.A.
George R. Askwith, K.C., C.B.
Edward Bond, M.A.
Professor S. J. Chapman, M.A.
Sir Ernest Clarke.
Reginald Dudfield, M.A., M.B.
Sir William C. Dunbar, Bart., C.B.
*Prof. F. Y. Edgeworth, M.A., F.B.A.
Alfred W. Flux, M.A.
H. Fountain.
Edgar J. Harper.
Noel A. Humphreys, I.S.O.
*E. A. Hastings Jay.
A. W. Waterlow King, J.P.
Bernard Mallet.
Sir Theodore Morison, K.C.I.E., M.A.
Sir Shirley F. Murphy, F.R.C.S.
Arthur Newsholme, M.D.
*George Paish.
Sir Lesley Probyn, K.C.V.O.
R. H. Rew.
Simon Rosenbaum, M.Sc.
Charles P. Sanger, M.A.
William N. Shaw, D.Sc., F.R.S.
*J. D. Stuart Sim.
Professor William Somerville, D.Sc.
*T. H. C. Stevenson, M.D.
Thomas A. Welton, F.C.A.
Robert A. Yerburgh, M.P.
G. Udny Yule.

Those marked * are proposed as new Members of Council.

TREASURER.

Sir Richard Biddulph Martin, Bart. (*Hon. Vice-President*).

HONORARY SECRETARIES.

R. H. Rew (*and Foreign*). G. Udny Yule. A. W. Flux, M.A.

The Council received with regret the resignation of Mr. W. H. Clark, on his appointment on the Council of India, of the position of Hon. Secretary, and elected Mr. A. W. Flux as his successor under By-Law 15.

The abstract of receipts and payments, and the estimate of assets and liabilities on December 31, 1910, together with the report of the Auditors on the accounts for the year 1910, are appended.

Signed on behalf of the Council,

(Signed) George Hamilton,
President.

R. H. Rew,
G. Udny Yule, } *Hon. Secretaries.*
A. W. Flux,

(Signed) C. M. Kohan,
Assistant Secretary.

APPENDICES TO ANNUAL REPORT.

A (i).—Abstract *of* Receipts *and* Payments *for the* Year *ending* December 31, 1910.

RECEIPTS.

				£	s.	d.
Balance in Bank on Current Account, December 31, 1909	151	8	6			
Balance of Petty Cash Account......	–	3	5			
,, Postage Account	–	18	8	152	10	7
Dividends on 2,371*l*. 6*s*. Consols, Account A	55	16	4			
Dividends on Consols, Account B (Guy Bequest) ...	258	3	11			
Dividend on G.N.R. Stock..................	37	13	4	351	13	7
Annual Subscriptions:—						
40 Arrears...........	84	–	–			
567 for year 1910 ...	1,190	14	–			
14 in Advance for 1911	29	8	–	1,304	2	–
621						
Compositions				140	14	–
"Journal" Sales				326	3	4
Advertisements in "Journal"				41	10	–
Library. R. Econ. Soc.				12	16	6
				2,329	10	0
Sale of Consols				500	–	–
Income Tax Refunded				68	6	3
Total				£2,897	16	3

PAYMENTS.

				£	s.	d.
Rent and Taxes:—						
Rent, less Tax......	£355	12	6			
Taxes, 1909-10	46	9	6			
Total	402	2	–			
Less Sub-let ...	25	–	–	377	2	–
Fire, Light, and Water				55	1	–
Furniture and Repairs				34	12	1
Salaries and Wages				582	2	–
"Journal," Printing and Paper	£708	15	1			
,, Shorthand Reporting	31	5	4			
,, Literary Services	63	8	6	803	8	11
Ordinary Meeting Expenses				30	14	3
Advertising				46	2	9
Postage and delivery of "Journals"				64	7	4
Stationery and Sundry Printing...				71	13	11
Library				74	9	–
Incidental Expenses				83	11	11
Medals..................................				1	10	–
				2,224	15	2
Purchase of Consols, Account B (Guy Bequest)......................				65	2	1
Electric Light Installation............	£85	2	9			
Re-decoration of Premises	255	6	–			
Electric Fittings	33	18	6			
Linoleum and Furniture	61	13	2	436	–	5
				2,725	17	8
Balance of Current Account at Bank, December 31, 1910	£170	9	5			
Balance of Petty Cash	–	2	11			
,, Postage ...	1	6	3	171	18	7
Total				£2,897	16	3

(Signed)

"Chas. Atkinson,
"S. Chapman,
"Thos. A. Welton,
Auditors."

"*February* 8, 1911.

A (ii).—ESTIMATE *of* ASSETS *and* LIABILITIES *on* DECEMBER 31, 1910.

LIABILITIES.	£	*s.*	*d.*	ASSETS.	£	*s.*	*d.*	£	*s.*	*d.*
Messrs. Harrison and Sons, for December "Journal"	80	7	1	Cash Balances				171	18	7
Miscellaneous Accounts	254	10	4	2,371*l.* 6*s.* Consols (General Fund). (Price, December 31, 1910, 79*l.* 10*s.*)	1,885	3	8			
14 Subscriptions received in advance	29	8	–	10,527*l.* 12*s.* 3*d.* Consols (Guy Bequest). (Price, December 31, 1910, 79*l.* 10*s.*)	8,369	9	–			
	364	5	5	1,000*l.* G.N.R. Preferred Converted Ordinary Stock. (Price, December 31, 1910, 95*l.* 10*s.*)	955	–	–	11,209	12	8
Balance in favour of the Society (Exclusive of (1) Books in the Library; (2) Journals in Stock; and (3) Pictures, Furniture, and Fixtures)	11,145	16	4	Arrears of Subscriptions recoverable (say 40)				84	–	–
				Sundry debtors				44	10	6
	£11,510	1	9					£11,510	1	9

A (iii).—BUILDING FUND (ESTABLISHED *July* 10, 1873): STATEMENT *on* DECEMBER 31, 1910.

This Fund is invested in Metropolitan Consolidated 3*l.* 10*s.* per Cent. Stock. On December 31, 1909, the Fund was invested in 494*l.* 9*s.* 11*d.* Stock. With the dividends received during 1910, additional Stock to the amount of 16*l.* 4*s.* was purchased by the Bank of England for the Society. Accordingly, on December 31, 1910, the total investment amounted to 510*l.* 13*s.* 11*d.* Stock.

(Signed) "CHAS. ATKINSON,
"S. CHAPMAN,
"THOS. A. WELTON, *Auditors.*"

"*February* 8, 1911.

A (iv).—" REPORT OF THE AUDITORS FOR 1910.

" *The Auditors appointed to examine the Treasurer's Accounts for the Year* 1910,

" REPORT :—

" *That they have compared the Entries in the Books with the several Vouchers for the same, from January* 1 *to December* 31, 1910, *and find them correct, showing the Receipts* (*including a Balance of* 152*l.* 10*s.* 7*d. from* 1909) *to have been* 2,897*l.* 16*s.* 3*d.*, *and the Payments* 2,725*l.* 17*s.* 8*d.*, *leaving a Balance in favour of the Society of* 171*l.* 18*s.* 7*d. on December* 31, 1910.

" *They have also had laid before them an Estimate of the Assets and Liabilities of the Society at the same date, the former amounting to* 11,510*l.* 1*s.* 9*d.*, *and the latter to* 364*l.* 5*s.* 5*d.*, *leaving an excess of Assets over Liabilities of* 11,145*l.* 16*s.* 4*d.*, *exclusive of* (1) *Books in the Library ;* (2) *Journals, &c., in Stock ; and* (3) *Pictures, Furniture, and Fixtures.*

" *They have verified the Investments of the Society's General Funds* (2,371*l.* 6*s. Consols* + 1,000*l. G.N.R. Stock*) ; *the Guy Bequest* (10,527*l.* 12*s.* 3*d. Consols*) ; *the Building Fund* (510*l.* 13*s.* 11*d. Metropolitan Consolidated Three and a Half per Cent. Stock*) ; *and also the Banker's Balance* (170*l.* 9*s.* 5*d.*) ; *all of which were examined and found correct.*

" *They further find that at the end of the year* 1909 *the number of Fellows on the list was* 825, *which number was reduced in the course of the year to the extent of* 37, *by Death, Resignation, or Default ; and that* 57 *new Fellows were elected or restored to the list, leaving on the list on December* 31, 1910, 845 *Fellows of the Society.*

(Signed) " CHAS. ATKINSON,
" S. CHAPMAN,
" THOS. A. WELTON, } *Auditors.*

" *February* 8, 1911."

B.—*Statement of the Condition of the Society in the last Twenty-five Years* 1886-1910.

Year.	Number of Fellows on December 31.	Number of Life Fellows included therein.	Losses during Year by Deaths, &c.	Gains by Election, &c., during Year.	Income from					Expenditure.			Amount Invested on December 31.	Year.
					Annual Subscriptions.	Compositions.	Journal Sales.	Investments and other Sources.	All Sources.	Total.	Of which On Journal.	Of which On Library.		
					£	£	£	£	£	£	£	£	£	
1886....	943	156	70	85	1,583	231	180	92	2,086	2,106[d]	735	32	2,500	1886
'87....	977	160	59	93	1,621	126	188	94	2,029	2,135[e]	609	87	2,500	'87
'88....	1,059	172	58	140	1,686	334	171	101	2,292	2,003	711	58	2,500	'88
'89....	1,060	175	69	70	1,678	126	229	82	2,115	2,060[f]	623	146	2,500	'89
1890....	1,063	177	65	68	1,764	84	155	94	2,097	2,096[a]	567	68	2,900	1890
'91....	1,019	172	80	36	1,707	42	146	181	2,076[g]	1,957[h]	582	172	2,900	'91
'92....	994	171	70	45	1,634	84	158	104	1,980	1,883[i]	539	94	2,900	'92
'93....	964	176	66	36	1,560	124	128	92	1,904	1,921	578	63	2,900	'93
'94....	933	180	67	36	1,491	105	152	82	1,830	1,904	649	75	2,900	'94
'95....	928	180	59	54	1,468	63	180	82	1,793	1,823[j]	576	56	2,900	'95
'96....	910	181	48	30	1,478	42	168	84	1,772	1,787	571	44	2,900	'96
'97....	892	182	58	40	1,472	145	157	83	1,857	1,986[k]	650	50	2,900	'97
'98....	878	180	57	43	1,451	115	182	105	1,853	1,825	609	55	3,300[l]	'98
'99....	896	181	44	62	1,432	95	167	127	1,821	1,805	564	33	3,300	'99
1900....	923	179	36	63	1,514	21	189	148	1,872	1,817	521	53	3,300	1900
'01....	926	177	49	52	1,464	63	211	129	1,867	1,823	518	42	3,300	'01
'02....	932	177	52	58	1,504	21	255	152	1,932	1,839	543	73	3,300	'02
'03 ...	939	174	49	56	1,517	84	293	151	2,045	1,875	593	91	3,300	'03
'04....	925	175	58	44	1,407	124	253	152	1,936	1,931[a]	521	92	3,400	'04
'05....	911	178	59	45	1,465	168	220	220	2,073	2,074[m]	665	67	11,975[n]	'05
'06 ...	891	177	63	43	1,464	82	225	408	2,274[o]	1,988	645	95	11,449	'06
'07....	861	172	63	33	1,363	82	327[q]	408	2,180	2,401[p]	571	87	11,746	'07
'08....	855	170	46	40	1,339	84	254	494[r]	2,171[r]	2,428[s]	602	92	11,920	'08
'09....	825	167	82	52	1,307	84	273	396	2,060	2,369	641	99	12,084	'09
1910....	845	172	37	57	1,304	141	326	974[t]	2,746[t]	2,726[u]	803	74	11,210	1910

[a] Includes purchase of Government stock.
[d] Includes cost of Jubilee Volume.
[e] Includes cost of Catalogue and Index, and of Charter.
[f] Includes cost of part iv of Index to *Journal*.
[g] Includes Mrs. Lovegrove's legacy of 100*l*.
[h] Includes outlay for Guy Medal and for binding "The Times."
[i] Includes outlay for drainage repairs.
[j] Includes cost of Subject-Index to *Journal*.
[k] Includes cost of doing up interior of premises.
[l] Includes 400*l*. G.N.R. Stock, purchased with Mr. J. Heywood's Legacy of 500*l*.
[m] Includes 100*l*. to International Statistical Congress Fund.
[n] Includes the Guy Bequest. The total invested is now valued at current prices.
[o] Including 126*l*. for sale of books.
[p] Includes purchase of 600*l*. G.N.R. Stock.
[q] Includes special sales.
[r] Includes Sanford Bequest, 100*l*.
[s] Includes 160*l*. for Catalogue and 288*l*. for purchase of Stock.
[t] Includes 500*l*. from sale of Consols and 68*l*. Income-Tax refunded.
[u] Includes 436*l*. for re-decoration of premises, installing electric light and furniture.

C.—*Numbers of Books Added to the Library and Lent, and Numbers of Borrowers from the Library in the Sessional Years* 1908-09, 1909-10, *and* 1910-11.

Months.	Works Received.*			Books Lent.						Borrowers.			Fellows and Visitors using the Library.					Months.
				1908-09.		1909-10.		1910-11.								Called after 5 p.m. or remained after 5 p.m.		
	1908-09.	1909-10.	1910-11.	Works.	Vols.	Works.	Vols.	Works.	Vols.	1908-09.	1909-10.	1910-11.	1908-09.	1909-10.	1910-11.	1909-10.	1910-11.	
July		544	810	72	97	69	89	64	88	36	36	33	90	95	97	—	—	July
August	440	461	—	58	63	69	81	39	52	36	43	24	96	81	44	—	—	August
September			—	63	80	66	69	68	88	37	31	42	77	65	65	—	—	Sept.
October			—	74	90	86	104	91	101	41	53	56	98	104	95	1	5	October
November	482	465	—	99	118	98	124	49	59	45	63	35	77	110	103	8	19	Nov.
December			239	79	90	75	104	71	97	39	45	40	97	82	80	10	11	Dec.
January		56	101	68	78	94	115	81	101	29	57	54	64	92	120	3	33	January
February	510	49	54	89	106	86	92	64	74	54	44	38	95	76	84	4	21	February
March		63	64	94	118	96	118	95	114	44	54	62	101	114	122	18	23	March
April........		72	66	91	105	92	119	40	52	44	51	29	88	105	99	14	19	April
May	550	44	86	80	104	74	89	105	122	51	50	65	109	102	115	9	23	May
June		72	74	97	112	76	98	65	75	43	50	42	110	121	79	18	10	June
Sessional year....	1,982	1,826	1,494	964	1,161	981	1,202	832	1,023	499	577	520	1,102	1,147	1,103	85	164	Sessional year
Monthly average	165	152	124	80	96	86	100	69	85	41	48	43	92	95	92	10	18	Monthly average

* These figures represent the number of works entered during the year under "Additions to Library" in the *Journal*, and not the number of separate volumes; they are exclusive of about 170 weekly, monthly, and quarterly periodicals regularly received.

PROCEEDINGS *of the* SEVENTY-SEVENTH ANNUAL GENERAL MEETING, held on June 15, 1911.

SIR ALFRED E. BATEMAN, K.C.M.G., Honorary Vice-President, in the Chair.

THE Minutes of the previous Annual Meeting were confirmed.

The CHAIRMAN announced that under the conditions laid down for the award of the Guy Medal the Council had awarded a medal in gold to Mr. G. Udny Yule for his extraordinary services to statistical science, for his valuable contributions to the transactions of the Society, and for special work done in the interests of the Society.

The Report of the Council was presented.

The CHAIRMAN moved "that the Report of the Council, the Abstract of Receipts and Payments, the Estimate of Assets and Liabilities, and the Report of the Auditors, be adopted, entered on the Minutes, and printed in the *Journal*." He said that it was satisfactory that for the first time for about six years the numbers of Fellows had ceased to show a decrease. Although the increase was small, it was very important that they should be on the up-grade again. That was due largely, he thought, to the Executive Committee, to the work which had been done in the past year, and to the help which they had received from the Assistant Secretary in further popularising the Society by putting the Library to greater use, and by suggesting various improvements. After referring to the great loss sustained by the Society through the deaths of Sir Charles Dilke, Sir Francis Galton, and Lord Wolverhampton, the Chairman pointed out that they had, on the other hand, to congratulate themselves on the new accessions to their list of Fellows, including as they did a number of very distinguished names. In considering the finances of the Society, which appeared to him very satisfactory, they should remember that, although they had been obliged to sell out Consols to the value of 500*l*., they had been laying by the interest which their investments had been bearing for some years, so that they were now better off than when they received the legacy. He was sure it would give pleasure to all of them to know that the Council had awarded a Guy Medal in gold to Mr. G. Udny Yule. He had known Mr. Yule throughout the period that he had been connected with the Society, and although they all looked upon him as very young, they recognised that he had done a great deal of work, both within the Society and outside; and, as one of the oldest members, he congratulated him on his having had this distinction conferred upon him.

Mr. A. H. BAILEY seconded the motion, which was carried unanimously.

The Ballot was then taken, and the Scrutineers (Mr. GRIFFIN and Mr. SPEAR) reported that the proposed President, Council, and Honorary Officers for the ensuing session had been unanimously elected.

The HONORARY SECRETARY (Mr. R. H. REW) moved the following alteration of Bye-Law 8, of which due notice had been given :—

" After the words ' twenty guineas ' insert—

> ' or after the payment of twenty-five annual subscriptions the sum of ten guineas.' "

The Rule, if thus altered, would read as follows :—

" Every Fellow of the Society shall pay a yearly subscription of Two Guineas, or may at any time compound for his future yearly payments by paying at once the sum of Twenty Guineas, or after the payment of twenty-five annual subscriptions the sum of Ten Guineas, unless the Annual Subscription or Composition Fee shall be remitted by the Council; provided that the number of Fellows whose Annual Subscription or Composition Fee shall have been thus remitted, do not exceed five at any one time.

" Every person elected to the Society shall pay his first subscription (or if he desire to become a Life Fellow, his composition) within three months, at the latest, of the date of his election, if he be resident in the United Kingdom. If he be resident abroad, this period shall be six months. If payment be not made within the time specified above, the election shall be void."

Mr. REW said the bye-law at present provided that annual subscriptions may be compounded on payment of the sum of twenty guineas, either on election or at any subsequent time. The question had been frequently under the consideration of the Council whether or not any concession could be made to Fellows who had been paying annual subscriptions for a lengthened period. Now and again the matter had been brought to their notice by Fellows who had been paying for some years, and, of course, the answer had always been that the bye-laws did not allow of any reduction in the amount of the composition. The Council had had this question before them on several occasions during the past year, and after having considered various alternative proposals, they made the present recommendation. He might point out to the Fellows that there were two main considerations to bear in mind. The first was, of course, that they had to safeguard as far as they could their financial position. They were not a Society which wanted to make a profit on the year's transactions. They must, of course, pay their way, but so long as they did that they thought they ought to spend all their income in providing facilities for Fellows, and in promoting the objects for which they existed. Therefore, from that point of view, they had to be cautious in reducing the amount of their annual income. On the other hand, they were very anxious to retain on the roll of the Society Fellows who had been associated with them for a number of years. They thought it was of great importance that any Fellow who had been long connected with the Society should not withdraw if they could do anything to meet him by reduction of the payments which he would be called upon to make in the future. For his own part he thought it was more desirable to retain those who had been associated with them for a great many years than to look too nicely to the amount of money they would receive from them in the future. He hoped and believed that the present proposal would commend itself to the Fellows, because it had been carefully considered in view of both of those considerations. As to the risk they took, there were a certain number of Fellows who had been on the books for twenty-five years; and if they contemplated that all of those would compound at once, no doubt there would be a very great reduction of the Society's income, and they would probably be in some difficulty for some years to come. Still, the Council thought, so far as that risk existed, it was a risk they might be prepared to take, and he therefore begged to submit on behalf of the Council this alteration of the bye-law.

Mr. A. W. WATERLOW KING seconded the motion.

Mr. H. H. GRIFFIN moved the following amendment to the motion:—

"To substitute 'fifteen' for 'twenty-five,' and add after 'guineas' the words 'Any Fellow having paid twenty-five annual subscriptions shall, therefore, be created a life member and be free from any further payment to the Society.'"

He said that although he was the most junior and uninitiated of the Fellows of the Society, he had had a very long and exceedingly varied experience of different clubs and societies having a corresponding rule to this one. He pointed out that it would in his opinion be to the interest of the Society to offer greater inducements to its Fellows to retain their membership over a long number of years.

Mr. GRIFFIN'S motion not having found a seconder, the motion as proposed by Mr. Rew was carried unanimously.

The HONORARY SECRETARY (Mr. REW) having read out the list of defaulters, the PRESIDENT declared that they had ceased to be Fellows of the Society.

The HONORARY SECRETARY announced that the subject selected for essays in competition for the Howard Medal in 1911-12, was "The Results of Detention in Labour Colonies."

Mr. H. H. GRIFFIN proposed a hearty vote of thanks to the President, Council, and Officers for their services during the past year.

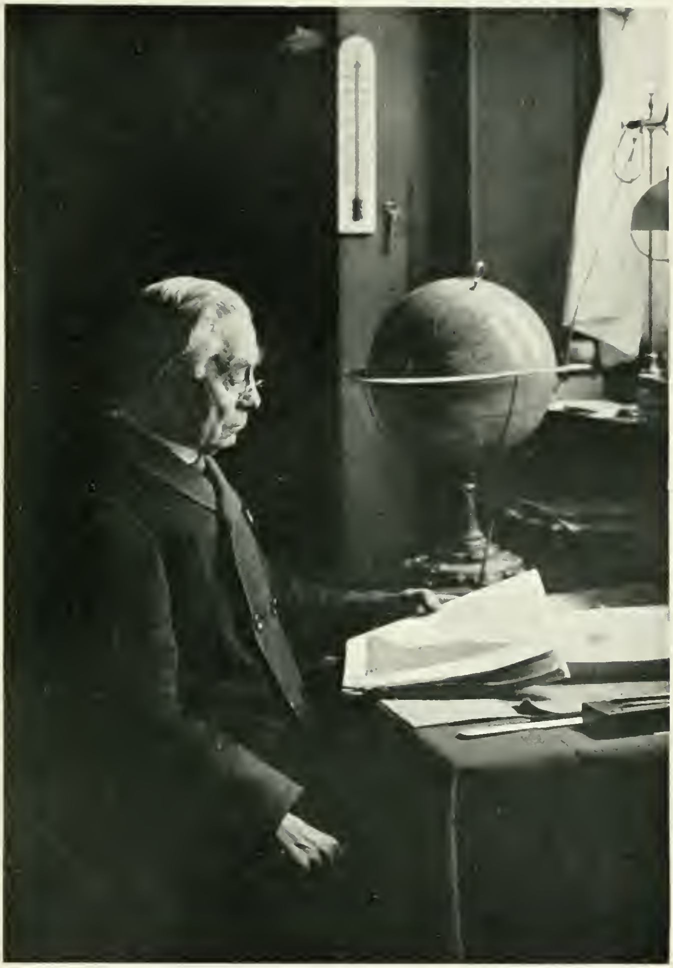
Mr. B. E. SPEAR seconded the motion, which was carried unanimously.

OBITUARY.

M. Émile Levasseur.

On the 10th inst., M. Emile Levasseur, Administrator of the College of France, member of the Institute, statistician, economist, historian, and geographer, died full of years and honours at the age of 83. Born at Paris, on December 8, 1828, M. Levasseur entered L'Ecole normale supérieure in 1849, and at once impressed his personality upon those with whom he came in contact. He turned his attention in the first instance to economics and especially to monetary questions, the theses "De pecuniis publicis" and "Recherches historiques sur le système de Law," both published in 1854, being his earliest productions. He pursued the same subject in a wider aspect in his work on the gold question, published four years later, which discussed the then recent discoveries of gold in California and Australia, at that time somewhat perturbing minds of economists and men of affairs, and the lucidity and insight with which M. Levasseur dealt with the question established his reputation. In the following year he published the first two volumes of his history of the working classes in France from Julius Cæsar to the Revolution, thus early demonstrating the mental energy and versatility which were his predominant characteristics. From that time forward a mere catalogue of his publications would occupy more space than is here available. A second edition of the first two volumes of his History of the working classes in France before 1789 was published in 1900-01, and the two later volumes, dealing with the period from 1789 to 1870, were published in 1903-04. The first part of his History of Commerce in France, dealing with the period before 1789, was published this year, and only a few days prior to his death he was engaged in revising the proofs of the second volume. In May last he completed a course of geographical lectures at the College of which he was so distinguished an ornament.

M. Levasseur was elected an Honorary Fellow of the Royal Statistical Society in 1860, a testimony that at that time his reputation as a statistician was established. He took part in the International Statistical Congresses, which prepared the way for the establishment in 1885 of the International Statistical Institute, of which he at once became a member, and was appointed a Viçe-President. To the proceedings of this body, he was from the first an active contributor, among his chief contributions being, "Statistique de la superficie et de la population des contrées de "la terre," which he first dealt with in 1885 and again in 1900 and 1902; "La démographie française comparée" (1888); "Méthodes et résultats de la statistique de l'enseignement primaire" (1889), a subject to which he also returned subsequently; "Tableau



M. ÉMILE LEVASSEUR.

synoptique de l'état et du mouvement d'une population presque stationnaire" (1892); "Statistique des forêts" (1895); "Répartition de la race humaine sur le globe terrestre" (1909). On more than one occasion he presented papers on agricultural statistics, and at the latest meeting of the Institute he dealt vividly and suggestively with the price of wheat in different countries in the nineteenth century.

On that occasion, in 1909, when the Institute for the second time met in Paris, M. Levasseur, as senior Vice-President, was called upon to take the leading part, owing to the vacancy in the Presidential chair occasioned by the death of Dr. Inama-Sternegg. It may not be inappropriate to repeat what was then said of him in the account of the proceedings which appeared in these pages:—

> The duties of Presidency devolved upon the three Vice-Presidents, MM. Levasseur, Lexis, and Troinitsky. On M. Levasseur as senior Vice-President, as Chairman of the Committee of Organisation, as Administrator of the College of France, and also, in his individual capacity as a distinguished Frenchman, fell the lion's share of the work. He discharged it with truly leonine energy. One may say, indeed, that 1909 will be known in the annals of the Institute as "M. Levasseur's year." Whether he was presiding at the General Assembly, expounding statistics in a section, lecturing to the Paris Statistical Society, proposing or responding to a toast at one of the dinners, or acting as host at the College of France, his brilliant eloquence, his fascinating vivacity, his tireless energy were unfailing and inexhaustible. Under the spell of his vivid personality the members present would have acclaimed him as the successor to Dr. Inama-Sternegg in the Presidential chair, but when at the General Assembly on the last day the time came to fill the vacancy, and Dr. von Mayr, with general assent, solicited M. Levasseur to accept the Presidency, he declined the position on the plea (incredible as it would be but for the inexorable record of time) of advancing years. Statistics, as the stale gibe has it, may prove anything, but they cannot prove M. Levasseur to be old, even although it is admitted that he was born in 1828.[1]

The following genial note which M. Levasseur addressed to the writer of that account may fittingly be placed on record at the time when we mourn the loss of one whose personality must long live in the memory of all those who at any time came within its influence:—

> Collège de France.
>
> MON CHER COLLÈGUE,
>
> J'ai reçu hier le N°. de Septembre du *Journal of the Royal Statistical Society* et je viens de lire le compte-rendu que vous avez donné, de notre XII^{e} session.
>
> Il est très exact et complet et donne une idée précise de nos travaux et de nos fêtes. Je vous en félicite et je vous remercie tout particulièrement de la manière flatteuse dont vous avez parlé de la participation du doyen des vice-presidents. Nous étions trop heureux de vous recevoir pour ne pas faire tous nos efforts pour rendre la session utile et agréable.
>
> Veuillez, mon cher collègue agréer l'expression de mes sentiments de cordiale confraternité.
>
> E. LEVASSEUR.
>
> Paris 15 8^{bre} 1909.

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[1] Vol. lxxii, part iii.

The offer of the Presidency of the Institute, which was formally made to M. Levasseur in 1909, was not the first occasion on which the members had wished to call him to the chair, a position for which he was in all respects eminently eligible.

The *Journal* of the Royal Statistical Society has been enriched by contributions from M. Levasseur's active pen. His article on "La statistique graphique" in the Jubilee volume is perhaps the best remembered, but other articles include "Tables of mortality "and survivorship" (vol. l) and "The Russian famine" (vol. lv). To the proceedings of the Statistical Society of Paris, of which he was at one time President, he made frequent contributions, the full list of which, from 1874 to the present date, numbers over sixty.

On the occasion of his eightieth birthday M. Levasseur was the recipient of a testimonial from his friends and admirers in France and other countries. The permanent memorial of the event which was presented to him took the form of a medal, on one side of which his portrait was engraved, on the other side the following inscription:—

1828-1908
A ÉMILE LEVASSEUR
Économiste, historien, statisticien, géographe ; membre de l'Institut.
Ses confrères, ses collègues, ses amis, ses admirateurs.
1908
Justum et tenacem propositi virum.

The presentation was made in eloquent terms by M. de Foville, and addresses expressing the affection and admiration of his friends and the widespread appreciation of his labours were also delivered on this occasion by MM. Léger, Lavisse, Liesse, A. Leroy-Beaulieu, Delatour, Chantavoine, and Raffalovich.

M. Levasseur entered the College of France as a Professor in Extraordinary in 1868, was given the chair of economics, geography, and history, and became an administrator of the College in 1903. He was elected a member of the Académie des Sciences in 1868. He was a member of the Council of Public Instruction, a vice-president of the Superior Council of Statistics, an ex-president of the National Agricultural Society, president of the Society of Political Economy of Paris, honorary president of the Geographical Society, and "président d'honneur" of the Society of Commercial Geography, as well as a member or associate of many foreign societies connected with statistics, economics, geography, and other sciences.

MISCELLANEA.

Census Notes. By Sir J. A. BAINES, C.S.I.

England and Wales.—The provisional returns were published earlier than usual, and in a form which places the main features of the general results clearly before the general reader. They have received, accordingly, considerable and appreciative comment from the Press, and it remains for this Society to take note, in anticipation of the full report, of the more prominent statistical points which appear upon the surface of the figures; and also to congratulate our colleague, the Registrar-General, upon the first fruits of the interest in vital statistics he always showed when taking part in our Committee work.

The annual rate of increase since 1901 was the moderate one of 1·04 per cent., as compared with 1·15 and 1·11 during the two preceding decades. It is, in fact, the lowest on record in this country. The rate of natural increase, which is but a very small fraction above that of the preceding period, has been gradually declining, and is only maintained by a fall in the death-rate greater than that in the rate of birth. Gratifying as this may be for the moment, it cannot be regarded as more than a temporary counterpoise to declining natality; people must die, in the end, but there is no compulsion on them to be born. The drain by emigration, again, has shown an upward tendency, disconcerting to the annual estimate of population essential to vital statistics, and not showing signs of being susceptible of accurate record. We are all agreed as to the only cure for this uncertainty.

The pressure of population on the land is now 618 per mile. In 1871 it was 389; the rise, therefore, amounts to about 58 per cent. By a coincidence, this rate is identical with that of the corresponding rise of the density of the German Empire during the same period, but the area of the latter is 3½ times ours; the pressure per square mile, therefore, in the two years mentioned was only 196 and 311, respectively. One of the subjects treated in this report in considerable detail may be taken in connection with the density, viz., the relative growth of the rural and urban population. The distinction is recognised as conventional so far as the smaller units are concerned. Accepting the official partition, about 78 per cent. of the population is urban and 22 rural. A short table carries these figures back to 1881, and shows that whilst the population as a whole increased in the twenty years by 39 per cent., the urban element increased by 60 per cent., but that classed as rural fell off by 5·4 per cent. In regard to the internal increase of the urban communities, it is shown in another table that the general percentage of 11 is not typical of any detailed grouping of units, but is greatly in excess of the rate at the top and bottom of the table, and equally below that prevailing in the groups of places containing between 5,000 and 250,000 inhabitants. Another prominent feature in the general return is the large increase of the suburban districts of London, as contrasted with the decrease in the metropolis itself, a fact mentioned in 1901, and which since then has been noted as prevalent in the case of most large cities, here and abroad. Surrey and Hertfordshire seem to have increased in favour; Middlesex, Kent and Sussex to have declined. The large increase in Wales is confined, to a great extent, to the mining tracts and seaports, and has been accompanied, as might be expected, by a decline in the proportion of women from 998 to 977 per 1,000 men. In England, on the other hand, that proportion remained stationary, being 1073 against 1072 in 1901. It was pointed out, however, on that occasion that the general proportion of 1068, which is still maintained, would have been reduced to about 1050 had the forces serving in South Africa been taken into account. There is no doubt, then, that the proportion of women is rising, and, looking to the fact that the increase has been steady since the tide of emigration began to flow with additional strength, the excess of 1,178,300 must be attributed in the main, though not perhaps entirely, to the depletion of the country of its adult males. In Italy and Denmark a smaller but equally continuous drain is recorded. The figures above quoted seem to throw a little doubt upon the contention recently published by a poetical he-suffragette, that in consequence of the boycott of the census by the women of England, the results are devoid of any title to statistical value. "Contrariwise," to use the expression of Tweedledee, the proportion of women to men materially increased in London, Manchester, and Middlesex, where the boycott is said to have been most effective.

Ireland.—The rate at which the population has been diminishing since the mid-forties has received a considerable check, and instead of a loss of 5 per cent. one of only 1·7 is recorded. The difference, however, is mainly in degree, not in character. The gain of 63,000 is less than that in 1901, when it was over 80,000, and the loss is only 140,000, as compared with 328,000 on the last occasion. The distribution of the variation, however, is the same, with the exception that in addition to the growth of Belfast and Dublin a fair increase in Kildare is recorded. Against all the other subdivisions the minus sign has still to be affixed. In so far as the falling off is attributable to emigration, it is curious to note that the outward current does not affect the proportion of the sexes in the same way as in most, if not all, other countries exporting large numbers of their inhabitants. The number of females to 1,000 males in Ireland is 1,004, as against 1,020 ten years ago, and even this slight excess is only due to the influence of the principal cities, in which it reaches or exceeds 1,100. Elsewhere the proportion does not rise much beyond 950 or 970. The only other point to be noticed in regard to these provisional figures is that Belfast shows a growth of 10 per cent. only, as compared with 28 in 1901, whilst Dublin is not separately shown, probably on account of intricate readjustment of boundaries or some similar administrative difficulty.

Scotland.—The fall in the rate of increase from 11 per cent. to 6·4 has been received with much comment and some disappointment north of the Tweed, and is attributed in several quarters to emigration from the rural districts, with the corollary that "something must be done," by legislation or other means, to counteract this recrudescence of what used to be considered a national tendency. So far as the provisional returns go, they certainly appear to confirm to a considerable extent the view that emigration from certain parts of Scotland has been unusually active in late years, though, with a few exceptions, it is confined to the same tracts as in former times. As in 1901, there are fifteen counties showing a decrease and eighteen with an increasing population, but they are not respectively the same at the two enumerations. The increasing section contains 81 per cent. of the population of 1901, and now constitutes 82 per cent. of the new record. It increased by 8·2 per cent.—a very moderate rate. On the other side of the account is the aggregate of far smaller counties, which fell off by about 2·5 per cent. It should be noted, however, that the absolute figures of growth assign over 53 per cent. of the additional population to Lanark and Renfrew, the industrial centres. Adding the 17 per cent. of Fife, and 9 of Dumbarton, 80 per cent. is accounted for. There is this distinction to be drawn between these four units, that in the two first the proportion of females to 1,000 males rose by 19 and 10 respectively; whereas in the case of Fife and Dumbarton it decreased by 56 and 6. In the country as a whole the said proportion rose from 1,057 to 1,062. In the group of increased population it rose from 1,038 to 1,047, but in the other section, where the proportion had been as high as 1,141, it receded to 1,137. The most marked differences appear in the Orkneys, from 1,046 to 1,113, and in Fife, from 1,082 to 1,026. Edinburgh put 35 on to its previous 1,121, whilst Haddington took off the same relative excess; domestic service was probably the cause of the rise, though not wholly accountable probably for the fall. It will be interesting to trace these changes through the age and marriage returns when they are published.

Other British returns have not yet been received except from Ceylon and two of the West Indian groups. In the first named, excluding the military and shipping population, which was abnormally large in 1901, owing to the presence of the Boer prisoners of war, the increase was 14·6 per cent., or 1·37 per cent. per annum, as compared with 1·72 per cent. between 1891 and 1901, when there was a remarkable growth of the "Estate" population, which seems to have considerably slackened of late. On the other hand, the proportion of women on the Estates increased by over 19 per cent., whilst the men increased by less than 11. In the general population, excluding Estates, the women show a slightly lower rate than the other sex, but the total result is to raise the proportion of females per 1,000 males from 880 to 888. It is still only 848, however, on the Estates. The town of Colombo increased by 32·5 per cent., and has more than 211,000 inhabitants. Galle, now in the backwash of ocean traffic, and Kandy, the ancient capital, show a lower rate of increase than the population at large. The density of population now stands at 161 per square mile. In Barbados, on the contrary, the extraordinary pressure on the land has been relieved from over 1,100 to 1,038 per mile. There has been a decrease in population since 1891 amounting to 5·75 per cent. The official estimate, by the way, gave an *increase* of 6·3 per cent.—this, however, in passing, with a side glance at the uses of frequent enumeration. The falling-off is entirely on the side of the males, where it reached 13·5 per cent. The spindle-side maintained and increased its numerical predominance, and where there were 1,239 women to 1,000 men, there are now 1,441. To a smaller extent the movement in the Leeward Islands has been on the same lines. The males have diminished by 2 per cent. and the other sex has increased by over 3, so that there are 1,311 women per 1,000 men, instead of 1,242. Except in Trinidad and the continental possessions of British Guiana and Honduras, all of which are large importers of labour, the excess of females is characteristic of all the West Indies.

Through the courtesy of our foreign colleagues we have been furnished with the provisional totals of several European and other States, either worked up in some detail, or simply totalled for administrative subdivisions. On the present occasion space does not admit of more than a cursory notice. Germany, Holland, Denmark, and Switzerland show a higher rate of annual increase than in 1900 or 1901; the rest, a slight falling off. Setting aside the Eastern European States, Germany heads the list with an increase of over 15 per cent. in the 10 years, and Holland approaches it with 14·8. Switzerland and Denmark show 13·2 and 12·6 respectively. Austria returns 9·2 per cent., which is but little below the last rate. Norway runs with Scotland. Bulgaria and Bosnia are still above the European average, but not so markedly as in former years. The proportion of females to males has fallen in the three countries of greatest relative increase, but has risen materially in Denmark, a fact attributed to the emigration of men. In the Austrian and Norwegian returns sex is not distinguished. The comparison in the German return is with the results of 1905, and indicates the general tendency found elsewhere, for the women to increase more than the men in large cities and their suburbs. To this the great seaport of Hamburg is the only exception. On the other hand, in the tracts of generally small growth, such as Pomerania and East Prussia, the rate of increase is far slower amongst females than amongst males. It may be that the tide of emigration, which used to set southwards and carry the men to the industrial provinces of Westphalia and the Rhine, has now changed, and bears the women into domestic or commercial employment in Brandenburg and the larger towns. In regard to the increase of the population generally, the more prominent features appear to be the cession of place by Berlin to its immediate neighbourhood, the high rates in Westphalia, Rhineland and the Free Towns, and the depression of the two Northern Provinces just named and of Alsace-Lorraine. The weight of Prussia in the population of the Empire has risen from 60·1 per cent. in 1871 to 61·9; that of Saxony, from 6·2 to 7·4 per cent.; of Hamburg, from 0·8 to 1·6: with smaller rises in the case of Lubeck and Bremen. The rest have proportionally receded. The retarding factors in Austria seem to be Bohemia, Moravia, and Styria, and even Galicia has not shown the growth of the two preceding periods. Carinthia, Carniola, and Upper Austria have never been very high in their rate. Of the chief cities, Trieste, Lemberg, Cracow, and Czernowitz have increased by 23 to 29 per cent., and Vienna by 17. Gratz is but little in advance of its rural surroundings, and Prague has hardly moved. On the whole, the 7 larger aggregates have added 26·5 per cent. to their population, and the 9 towns with from 50,000 to 600,000 inhabitants have increased by more than one half. The rate slackens as the unit decreases, until it falls to less than 1 per cent. in the places of less than 2,000, which contain half the population of the State. In Denmark, too, though the difference is far less, the rural population increased at a very much lower rate than the urban, which is mainly that of Copenhagen. The difference in Norway is considerably less, though in the same direction, and Christiania shows a rate only a little above that of the country as a whole.

The Western Hemisphere has provided two sets of returns, one for Mexico the other for the United States. In the case of Mexico, the rate of increase, 10·7 per cent. since 1900, falls considerably short of that for the preceding period and is unequally distributed, for the nine-tenths of the population counted as rural increased by 9·7 per cent. and the city residents by over 20 per cent. The capital shows 27·5 per cent., and three of the other five cities considerably exceed this proportion. The density, however, is still below 20 per square mile. The women are again to the fore, especially in the towns, where they average 1,170 to 1,000 men, against 1,144 ten years ago. In the population, as a whole, the corresponding figure is 1,026, as compared with 1,015.

The Bulletin issued by the Washington Census Bureau contains the population by States, without distinction of sex, placed side by side with that returned in 1890 and 1900, and the density on each occasion. This last has risen from 21·2 to 30·9 per square mile, and varies from 508 in Rhode Island to less than 1 in Nevada. The increase in population amounts to 21 per cent. Combining these two factors it will be seen that a third of the area lies above the mean density with an average of 72·5 per mile, and this section has increased its population by just over 16 per cent. The two-thirds of the territory which carry less than the mean number per mile average only 10 to that unit, but have increased by 41 per cent. The extremes of the table of increase-rate by density are remarkably higher than the middle portion, especially in the more sparsely peopled tracts. From 30 to 150 per mile, for example, the increase is between 12 and 13 per cent. over some 42 millions of people. The 20 millions more thickly congregated increased by about 24 per cent.; and the 39 millions at less than 30 per mile increased by 37 per cent., when averaging 18 per mile; 57 per cent. when averaging 7·5, and 62 per cent. when distributed at the rate of 24 per 10 miles. One of the most interesting of the general features of this Census is the relative distribution of the population between East and West, and the increasing tendency of the latter to make the old East "tip up." Taking the centre of population as ascertained in 1900, and ignoring the distinction between North and South, the westward trend, even roughly calculated, is quite perceptible, though not very pronounced. To the east of this imaginary line lies 49·7 per cent. of the population on 17·8 per cent. of the area. Ten years ago the proportion was 50·3, which is now transferred westwards. The population on the East increased by 19·6 per cent. and on the West by 22·5, and the density, which was 72·5 per mile on the East and 15·4 on the West, is now 86·7 and 18·9 respectively. Beyond this approximate deduction, the return does not help us.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Publications issued by and in preparation for the National Monetary Commission of the United States.* Washington, 1910-11.

This great series of publications, nearly fifty in number, will prove of the utmost value to all English-reading students of the history and practice of banking. The banking systems, past and present, of nearly all the important countries of the world are exhaustively dealt with, and a mass of material is now available which had to be sought previously in a great variety of sources in several different languages. Many of the volumes have been specially written, or the material in them collected, for the Commission by authoritative writers in each country; and in other cases standard works have been specially translated. The great bulk of the material thus presented is descriptive, and little attempt is made at comparison or co-ordination. It will be chiefly useful, therefore, to two classes of readers, those who desire detailed information respecting the banking system of some particular country, and those who wish to generalise from or to compare the banking experience of different parts of the world by quarrying in this rich mine of information. The volumes vary a good deal in the degree to which they are able to give up-to-date information; but on the whole they are as satisfactory in this respect as could be expected. The information in the statistical volumes is brought up to the year 1909.

It is a very remarkable thing that such a series as this should have been published by the authority and at the expense of a Government. The United States Commission, appointed in 1908 "to inquire into and report what changes are necessary or desirable in the monetary system of the United States or in the laws relating to banking and currency," were empowered "to examine witnesses, and to make such investigations and examinations, in this or other countries, of the subjects committed to their charge as they shall deem necessary." They have interpreted this authorisation in no narrow sense, and the collection of much of the information which they now present to the public must be ascribed to a disinterested love of knowledge on their part, rather than to any bearing that it can have upon the particular problem for whose solution they were called into existence. But we need not be any the less grateful to them on this account; although our special thanks are probably due to Professor A. P. Andrew, Special Assistant to the Commission, by whose hand, one suspects, Philander C. Knox, of Pennsylvania, Hernando D. Money, of Mississippi, Lemuel P. Padgett, of Tennessee, and the other business men who sat upon Senator Aldrich's Commission may have been led into the paths of science.

It is scarcely possible to attempt any kind of detailed review of material so ample. I will attempt no more than to indicate briefly those parts of it which are likely to prove most interesting to English readers. Starting with England, we have, first of all, to lament another lost opportunity of reaping the fruits of Professor Foxwell's great knowledge and experience in matters of English banking. A *History of Banking in England* from his hand was originally announced in the list of the Commission's publications, but we understand that there is now little prospect of its appearing. The volume entitled *The English Banking System* (Senate Document 492, price 35 cents), which has been very well compiled, begins with a brief but masterly account of the English financial system from the pen of Mr. Hartley Withers. Mr. Withers is able, in spite of some compression, to give a more accurate and intelligible account of the existing position than is to be found elsewhere, and to supply a good deal of information with regard to common practice which only a writer is in a position to give who combines wide knowledge of the City with an instinct for what is important and interesting to an outside student of it. This is followed by some useful historical collections relating to the Bank Act, compiled by Sir R. H. Inglis Palgrave, being an account of the controversies preceding the Act, the correspondence between the Bank and the Government on its suspension in 1847, 1857, and 1866, and extracts from various committees of inquiry into its working. Sir R. H. I. Palgrave also brings up to date the statistics, given in his book on Bank Rate, of the fluctuations in the rate of discount in the principal European centres. This very useful volume also contains a short history of the London Bankers' Clearing House, by its secretary, Mr. R. M. Holland. In another volume a series of interviews[1] are published with about a dozen leading bankers, of which the most interesting are those with the authorities of the Bank of England, Sir Felix Schuster, and the late Lord Swaythling. The evidence of the authorities of the Bank of England is notably less intelligent than that of the other bankers, and their unnecessary secretiveness stands out in marked contrast to the readiness of Sir Felix Schuster, for example, to supply information. The following extract from Lord Swaythling's evidence, for which it would be interesting to obtain corroboration, refers to a practice not generally known:—

Lord S.—London is the only country where they pay freely in gold, but even that is now qualified in rather a small way. They have got what they call an export corner; that is, they sift out the minimum legal weight of the sovereigns and heap them up for the exporters. If they give us full-weight sovereigns we would be very glad to get them, but they will not. We now could send gold to France if we could get full-weight sovereigns, but we cannot get them. Formerly they did not do those things.

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[1] The value of some of the information is diminished by the absence of any date. It is not even clear in what year the inter iews took place.

Q.—Where are the full-weight sovereigns?

Lord S.—Oh, they keep them for interior purposes. If Liverpool and Manchester banks want sovereigns they get full weight, because freight is against us sending them from the north to the Continent. In any of the north-country places you have the most beautiful, bright, heavy sovereigns, which we should like to see in London, but we cannot get them.

Lastly, there is a considerable mass of statistics (together with similar statistics for France and Germany) for the years 1867 to 1909. These are mainly derived from the *Economist* and do not seem to contain anything novel.

Passing to Germany we find a large amount of printed matter, but not a great deal specially prepared for the Commission. There is a complete translation of the stenographic reports of the German Bank Inquiry of 1908, covering more than 2,000 pages, but it does not seem to be a document the study of which a foreigner will find repaying. There are translations also of the banking laws from 1875 to the last revision of 1909, and of a series of articles arising out of the Bank Inquiry on the renewal of the Reichsbank Charter. A volume of *Miscellaneous Articles on German Banking* (Senate Document 508, price 50 cents) is much more useful and provides the best general account of the German system, dealing with co-operative credit societies, savings banks, and land mortgage associations, as well as with banking proper. Amongst the most valuable and important of these monographs may be mentioned *The Statistical History of the German Banking System*, 1888-1907, by R. Franz, and *The Method of Payment by means of Bank-account Transfers*, by M. Wittner and S. Wolff. Another volume comprises a translation of the account of the Reichsbank published on the occasion of its twenty-fifth anniversary in 1900. It is a fairly useful volume, but is already a good deal out of date, and being of the nature of an official *apologia* gives a rather different account, in some particulars, of the management of the Reichsbank than one derives from more impartial sources. Lastly, there are interviews with leading bankers, corresponding to those for England, amongst which those with the authorities of the Deutsche Bank and of the Dresdner Bank may be specially mentioned. A translation of Dr. Riesser's standard work on the German *Grossbanken* is announced as being in the press.

The material relating to Germany amounts altogether to between 4,000 and 5,000 pages, being about ten times the amount of space devoted to England; but one searches in vain for any co-ordinated account of the system as a whole, with the proper emphasis upon what is important, at all comparable to Mr. Withers' essay on the English system. German banking methods are so very different from English that any comparison between them is difficult. The most striking points of difference are, perhaps, the extreme conservatism of some of the German administrations in monetary practice, the readiness of German bankers to trouble their customers with petty fees and charges and their unwillingness to court their favour by performing gratuitous services for them, the close connection of the banks with the Stock Exchange and with the provision of working capital for industry, and the very important place taken in the banking world by co-operative societies. These circumstances work together to produce most of the characteristic features of German banking, and hinder the wide diffusion of the use of banking facilities through all classes of the community which is characteristic of England and America. The co-operative societies, whose savings and deposits in 1907 were as great as the total deposits in the hands of the "great banks," draw off the tradespeople and smaller agriculturists; the non-liquid character of much of a German bank's investments makes them more dependent upon their own capital (which is immensely greater than in the case of English banks) and relatively less on the deposits of their customers; and the German tendency to charge small fees for everything, and such facts as that the Prussian Government will not even accept a cheque on the Reichsbank in payment of taxes, combine with these other causes to hinder the development of remittances by cheque.

The volumes relating to France are brief and to the point. The development of French banking is dealt with by Professor Liesse, and the Bank of France in its relation to national and international credit by M. Patron. Both these volumes, however, are largely historical, and both are mainly concerned with that wonderful institution the Bank of France. We are, therefore, rather lacking at present in the information which one chiefly seeks from a series of this kind, and which it is difficult to get elsewhere, namely, on actual banking practice and on the current methods of the joint stock banks. Perhaps M. Aupetit's volume on *The French Banking System*, which is not yet published, will supply this want. There are also interviews with some leading bankers,[2] and an account of the Bourse.

With the other volumes relating to Europe I must deal very briefly. Perhaps the most interesting is Dr. Landemann's account of *Swiss Banking Law* (401, price 30 cents). As in so many other matters, Swiss banking experience is of exceptional interest to students of comparative methods. Mr. A. W. Flux deals with Sweden (576, price 25 cents), Mr. Conant with Belgium (400, price 25 cents), and banking in Russia, Austria-Hungary, and Holland is described briefly in a single volume. Comm. Canovai's volume on Italy is not yet published. There are also short volumes, which do not deserve special mention, on the discount system, bank acceptances, savings banks, and fiscal systems of Europe.

Of extra-European countries, other than the United States,

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[2] The *Interviews on the Banking and Currency Systems of England, France, Germany, &c.* (Senate Document, 405, price 55 cents), several of which have been referred to already, form a single volume, which contains much useful evidence on questions of actual banking practice.

Mexico and Canada are dealt with in detail. Of the three volumes on Canada, *The Canadian Banking System* (Senate Document 583, price 30 cents), by Professor J. F. Johnson, is the most valuable; but the volume of interviews with leading Canadian bankers forms a useful supplement to it. Mr. Conant's account of *The Banking System of Mexico* (493, price 35 cents), which deals with the period from the banking law of 1897 down to 1909, is chiefly interesting in connection with the gold exchange standard.

The treatment of banking in the United States itself is naturally very full. That this treatment is too largely historical seems to me the main criticism to which it is open. *The First and Second Banks of the United States* (571, price 30 cents), by Dr. Holdsworth and Professor Dewey, *State Banking before the Civil War* (581, price 50 cents), by Professor Dewey and Dr. Chaddock, and *The Origin of the National Banking System* (582, price 25 cents), by Mr. Davis, have no reference to anything that has happened within the last forty-five years. Apart from volumes on certain special points, this only leaves us with the *History of Crises under the National Banking System* (530, price 50 cents), by Professor Sprague, and *State Banks and Trust Companies since the Passage of the National Bank Act* (659, price 30 cents), by Dr. Barnett, both of which are also almost wholly historical, although the facts with which they deal are more recent.

Of the present position and organisation of the National Banks, or of those features of current banking practice and control about which academic students cannot easily obtain information, and about which a study of the laws can tell nothing, there is scarcely a word. One could read every page of the publications of the Commission and yet carry away, out of this great mass of law, statistics and the records of history, a very hazy knowledge of the real nature of the banking system of the United States as it exists at the present day. There are not even, as in the case of European countries and of Canada, any interviews with representative bankers, and the kind of evidence which is usually to be found in the reports of an English Royal Commission is entirely wanting. The nearest approach to this is a volume containing the replies of representative bankers to a circular letter of inquiry; but the questions asked in this letter had reference to matters of administrative detail of little general interest.

The English reader, therefore, is likely to turn to four volumes which deal very admirably with certain special points. Two of these—Prof. Kinley's *Independent Treasury System* (587, price 45 cents), and Mr. Cannon's *Clearing House Methods and Practices* (491, price 45 cents)—are standard works brought up to date for the Commission, and the other two—Professor Kinley's *Use of Credit Instruments in Payments* (399, price 25 cents) and Professor Kemmerer's *Seasonal Variations in the Demands for Currency and Capital*[3] (588, price 60 cents)—are statistical studies specially prepared for it. These last two volumes are based upon a wonderful collection of statistics, which must arouse the envy of English economists and statisticians, for whom the comparable English figures are, through the traditional secretiveness of English bankers, still wrapt in mystery. American bankers do not seem to be imbued with the prejudice which makes most English bankers believe that the publication of the most innocent figures will in some manner unexplained injure them in their business.

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[3] This volume is rather lengthy, but some of its results have been summarised by Professor Kemmerer in an article published in the March number of the *American Economic Review*.

There are, lastly, Senator Aldrich's opening address on the work of the Commission and his recent *Suggested Plan for Monetary Legislation*, which has given rise to widespread discussion and cannot be dealt with here; two enormous compilations on the Banking laws of the United States; and four volumes of statistics and diagrams. Amongst these Professor Andrew's beautiful volume of *Financial Diagrams* (Senate Document, 509, price $1.75), which has some reference to England, France, and Germany, as well as to the United States, deserves special mention.

These publications (which cost from 10 to 12 cents per 100 pages) can be obtained from the Superintendent of Documents, Washington, but some are, it has been stated, already out of print. A list of most of those, which have been received by the Royal Statistical Society, with their exact titles and references, can be found in the *Journal* for January, 1911, pp. 246 and 247. J.M.K.

2.—*England's recent progress: an investigation of the statistics of migrations, mortality, &c., in the twenty years from* 1881 *to* 1901, *as indicating tendencies towards the growth or decay of particular communities.* By Thomas A. Welton, F.S.S., F.C.A. lxiv + 742 pp., 8vo. London: Chapman and Hall, Ltd., 1911. Price 10*s.* 6*d.*

This work, which comprises 121 pages of text, 9 appendices (608 pages), and about 140 graphs, represents many years of labour, and the author is to be congratulated on the completion of such an undertaking. The subjects dealt with include, in addition to those mentioned in the title, changes in the age composition of populations, early marriages, occupations, &c., many of the subjects being worthy of, and sufficient for, independent monographs.

The book arouses a lively anticipation of a rich and varied feast of statistics, but we must confess to some disappointment. The arrangement of the book leaves much to be desired, and after much examination we have not been able to gather any very definite information, though possibly other readers, having leisure for more prolonged study, may be more successful. The author's well-known views as to the proper function of a statistician being the presentation of statistics without explanation or comment, have doubtless led him to curtail that part of his book which we have referred to as the "text." The comprehension of the facts and figures here presented, would have been much facilitated if he had not been so sparing in explanations and comments.

Mr. Welton has collated statistics for 209 districts and groups of districts, which he has classified as "10 large towns," "19 old towns of less magnitude," &c.; but, until Appendix F (p. 598) is reached, no scheme of classification of the districts is to be found. It is well known that the present partition of the country is most haphazard, and that in the decennial supplements to the Registrar-General's Annual Reports, registration districts represent townships, &c. The author has adopted an independent arrangement of registration districts to represent the "old towns," &c., assigning to them names which, in the Registrar-General's reports, connote different boundaries. The constitution of each of his areas is given in Appendix C, running to no fewer than 354 pages. In some cases he has used the existing registration districts, but assigned new names to them, which can scarcely fail to lead to confusion.

Knowing something of Ipswich, one of the author's "old towns," we have looked into the constitution of the area to which he assigns that name. We find that he has, in this instance, combined the registration districts "Ipswich" and "Woodbridge," and that his area includes not only Ipswich proper, but also the townships of Felixstowe and Woodbridge, each of which is something like nine miles distant from Ipswich, and a large area of a strictly rural character. Such an area cannot be regarded as sufficiently homogeneous for statistical treatment as a unit. "London" includes the registration districts lying between Barnet and Edmonton on the north, Croydon and Epsom on the south, Epping and Dartford on the east, and Chertsey on the west.

As a preliminary to estimating the migration, the age-distribution of deaths given in the decennial supplements required to be adjusted to determine the number of deaths to be assigned to the persons (of either sex) included in each age-group at the end of the decennial interval. Corrections (described as "empirical") have also been introduced in the age-distribution of the populations as determined at the four censuses. The methods adopted are given in Appendix A, from which may be quoted the method used in determining the number of deaths to be allotted to (say) males attaining the age of 0—15 years (the first age-group used). Such deaths are assumed to include—

All deaths at ages 0—5 ;
Three-fourths of the deaths at ages 5—10 ;
One-fourth of the deaths at ages 10—15

recorded during the intervening decennium. Different proportions of deaths are assumed in the cases of higher ages.

Having thus obtained figures for each sex-age-group showing the numbers living at each census and the numbers of deaths during the intervening periods, the measurement of the migration is taken to be the difference between the corrected population at the later census and the number derived by subtracting the deaths from the corrected population at the earlier census.

For the study of the changes in mortality in the selected areas, the author has devised an age-group "scale" of mortality—or rather, one showing the loss per cent. of the mean population in each age-group. The method by which the scale has been calculated is given (p. 44), but we have not been able to trace the data on which the calculations are based. This is the more to be regretted as the rates of loss in two age-groups appear to us to be somewhat unsatisfactory. Thus in the first age-group (0—15 years) the losses are given as 15·0 per cent. for males and 12·8 for females, rates which appear to be unduly high; while in the last group (75 years and over) the rates are 104·0 and 95·8 per cent., respectively, the former being manifestly absurd. The author offers no explanation for a loss of 104 per cent., but regards it as no obstacle to the use of his scale, which is to express the loss in each age-group in any area as a percentage of the loss in the corresponding age-group as given by his scale. He subsequently gives a long series of tables of index numbers based on the mortality figures so obtained. (Appendix F.)

Considerations of space prevent reference to the other subjects included in the book, but the foregoing will suffice to indicate the enormous (no other adjective will suffice) amount of work involved in the preparation of the book. We cannot help feeling, however, that the author has made a fundamental error in the choice of his areas. He has endeavoured to fit nebulous registration districts, or groups of such districts, to townships possessing distinct entities, and has thus attached new meanings to names conveying well-established ideas. Except perhaps in the case of a few of our largest cities, he would, we think, have done well to be content with registration areas, just as the Registrar-General has been in his decennial supplements. His results could then have been examined in comparison with official reports, and—a point which appears to be of some importance—his work could have been continued by others. As things are it is to be feared that his book must remain the beginning and end of the inquiry.

Every author is entitled to determine the form of his publication, leaving his readers to be satisfied or otherwise therewith. In the present case the arrangement of the book does not appear to us to be either convenient or happy. The largest part of the work is relegated to an appendix of 354 pages, which itself is summarised in another of 24 pages. Again, the mortality graphs are given at the beginning of the book, while the tables on which they are based are to be found in an appendix near the end. It is unfortunate also that the selected areas are not given in the same order throughout, an arrangement which would have facilitated cross referencing, and is the more necessary as there is no index. The only "list of places" is not strictly alphabetical, and a search for any given name involves an unnecessary expenditure of patience. To no place are more than three references given in the "list," although all are mentioned many times in the text.

Notwithstanding the criticism which we have felt bound to offer, we commend the book to statistical students, to whom it will afford many suggestions for lines of research in novel directions. We should advise attention being concentrated on the appendices in the first instance, not necessarily in the order in which they are given, but taken so as to follow the inquiry step by step. R.D.

3.—*Large and small holdings: a study of English agricultural economics.* By Hermann Levy, Ph.D., Professor in the University of Heidelberg. viii + 249 pp., 8vo. Cambridge University Press, 1911. Price 10*s.* 6*d.* net.

When Dr. Levy issued, seven years ago, his German treatise on the growth and retrogression of large farming in England, the work received due recognition in this *Journal*. Now that the Cambridge University Press has published an English version, expanded with much supplementary matter, including a useful bibliography and index, and when it is noted how the author has brought up to date his study of the most recent changes in our agricultural system and the legislative experiments lately attempted here, it is desirable to re-direct attention to the volume in its present shape. The ordinary English reader and student of agricultural economics will welcome the translation, which has been well rendered by Miss Ruth Kenyon and brings within the reach of many who could not easily penetrate the German text a serious and thoughtful essay, at once historical, statistical and economic, by a writer whose industrious search into the crowded field of agrarian literature has been accompanied by more than one personal investigation of the existing conditions of rural England. Dr. Levy has been for seven years a Fellow of our own Society, and he generously acknowledges the facilities his enquiries obtained within its ranks, dedicating his new edition to the memory of a lamented English colleague, Arthur Wilson Fox, whose untimely death he deplores, and whom he rightly describes as one who had in eminent degree the prosperity of English agriculture at heart. It is always an advantage to learn the impressions of a capable foreign student on a question more or less obscured in these days by the smoke of local controversy. The conditions governing the best unit of agricultural production form just such a problem, and one which, in its domestic aspect, stands again in some danger of distortion by the invasion of party political feeling which, as we are here reminded, at some earlier dates as well as in our own time, has misrepresented or exaggerated the real issues.

Dr. Levy fixes the epoch of the upward extension of large farming in England as between 1750 and 1880. From 1880 onward this movement he finds to have been checked. It is in the altered conditions, coincident with the lowered values of grain and the development of imported food supplies, characterising the last two decades of the past century, that reason is found for the challenge of the hitherto accepted dogma of the economic superiority of the large farm. If not new to the English student, the historical argument of this German writer is marshalled with careful precision. From that history Dr. Levy deduces the favour in which large holdings were held while grain ruled high and the reverse tendency in recent years. On the purely statistical side, no doubt, one may indeed be tempted to offer the criticism that—voluminous as are the reports, official and non-official, and many as are the more or less true pictures presented by the great agricultural authorities of the late eighteenth and early nineteenth centuries—the exact dimensions of the then prevailing units of agricultural occupancy are open to discussion. The basis we now possess of numerical fact was not then in existence; and when we remember how even Arthur Young erred widely by many million acres in his guess as to the measurement of the total surface of our English land, it may be questionable how far, after all, we know with precision the number of the farmers who fed the people of Great Britain a hundred years ago, what was the exact grouping of their farms, and what the acreage of their crops or the dimensions of their herds. Only since 1867 can we be said to know the average area of a British farm, and that only so far as cultivated grass and crops are concerned. A wide surface of grazings outside the cultivated area was not brought under review at all till within the last decade of the past century; and even now we cannot tell what the size of the whole area farmed in one occupation is. The inclusion of uncultivated as well as cultivated land is a material matter in the keeping of live stock. Although the weight attaching to this feature is not equal in all parts of England, it seriously vitiates many conclusions as to the working unit and the density of live stock maintained on groups of farms in the Northern counties, in Wales, and in Scotland.

Again, in the discussion of this question the definition of the terms "large" or "small" is very elastic. A farm spoken of as large in one district is regarded as small in another, and this difficulty of classification is acknowledged by the writer. He perhaps goes too far in asserting that the character of different types of agriculture may be best elucidated by an examination of the "extremes" at both ends of the scale. One might almost say that neither extreme is really typical, and that the method leaves out the most dominant farm type of all. In any general survey of English agricultural organisation the middle group of medium-sized farms, and not the relatively small margin at either end of the scale, is really distinctive of our national system. The way in which the large area of the medium and mixed class of farming still maintains indubitably its hold on our land system and the relatively small culturable surface affected by the grouping at one time, or the separation at another of the holdings in which it is farmed is, if not quite a negligible feature, one of less moment than appears to the over-zealous advocate of the artificially stimulated "small holdings" to which so many of us are tempted to pin our agricultural faith to-day. An impartial history and analysis of the changes in the types of farming on those areas which are neither large nor small—not below 50 acres and not over 300—would be a welcome supplement to any survey of the British farming changes in their extreme types of dimension, and the action and reaction of market conditions and labour problems on their relative suitability to the times.

Dr. Levy's fairness of view and his apt appreciation of the obstacles which any widespread equipment of rapidly multiplied units of cultivation with new buildings would involve, deserve praise, and indeed most of his general conclusions commend themselves, with little exception, to those who are familiar with the facts. None the less we may hesitate to follow him quite so far as he goes in associating the smaller farm type so closely with greater devotion to meat and dairy production. There are noteworthy cases to be remembered where the well arranged organisation of a mixed or large farm has proved its superiority to the personal efforts of the small farmer in the field of animal production.

To the large farm system Dr. Levy concedes absolute superiority in corn growing and mixed husbandry and the breeding of pedigree stock. He gives it on the whole also an advantage in potato growing, which is perhaps not quite the experience of East Lincolnshire; but he puts it only on an equality with the small holding in stock feeding. To the small holder he gives the first place in fruit growing, vegetable farming, poultry keeping, and "stock farming generally." It is the last of these statements one cannot endorse quite absolutely nor altogether accept the writer's view that the lack of scientific intelligence is of no great importance on a small dairy farm in these days when skill and science are so needful in achieving the best results for a milking herd.

The relative density of the cattle maintained per 1,000 acres of total area in England was effectively shown by diagram in the official returns for 1896. Were a similar graphic illustration of the counties where large and small holdings were most prominent placed beside this, it may be doubted if it could be shown that the large farming counties were uniformly deficient in the live stock they maintained. A winter census of live stock would moreover greatly increase the ratio of animals kept in arable districts. Nor has the progress in dairy stocks, as a recent issue of the agricultural returns reminds us, been greatest in small farm areas. While the cows of the South-West, North, and North-West of England have increased since 1875-9 by 20 per cent., or a little less, the percentage of development in the extreme and mainly arable East, where the holdings are still relatively large, suggests twice that rate of growth, and on the South-Eastern group of counties—where 74 head of this class of stock per 1,000 acres are now enumerated against only 48 before the beginning of the eighties—an improvement of 54 per cent. is recorded.

As in many an earlier review of this old standing problem, one is tempted, with no lack of gratitude to Dr. Levy's lucid and balanced arguments and with full appreciation of their value to current controversy, to conclude that there is no "natural order of battle" in grouping farms by size, that the factors at work are too numerous and too changeable to be stated with mathematical precision. May one not ask, however, how it comes about that two German students, who have lately aided us with their inquiries, should on one point come to such opposite opinions as when Dr. Hasbach foretold a victory for Protection in the multiplication of *petite culture* in England, and Dr. Levy finds in the unconditional Free Trade policy of this country the explanation of such revival as we have seen in the small holding, and regards its retention the only hope of maintaining a development in this direction? P.G.C.

4.—*Canada and the Empire.* By W. R. Lawson. viii + 420 pp., 8vo. Edinburgh and London: William Blackwood and Sons, 1911.

Dedicated to the Imperial Coronation Conference, Mr. Lawson bases on a critical examination of Canadian conditions, historical, political, financial, economic and commercial, a plea for closer bonds with the United Kingdom in an effective federation of the British Empire. In so far as it offers an exhaustive review of the Dominion's position the volume deserves attentive study by the statistician, although it is rather to the political thinker than to the student of statistics proper that the work is intended to appeal. The treatise dips deeply into matters of constitutional law, opens questions left by the Confederation Act of 1867 in the relations of the constituent provinces to the Dominion, and condemns the intrusion of domestic Canadian politics into the natural course of trade and business. The absence of any real understanding with the Mother Country on its immigration policy and land settlement, the risks of Americanisation, and the gigantic growth of the Canadian credit system are, nevertheless, discussed with much reference to the available statistics, as well as the several and separate aspects of Dominion, Provincial and Municipal finance. The critical review of Canadian railway finance will not fail to arrest attention from anyone who likes to test the customary vague or journalistic pictures of continuous growth by the arbitrament of figures. No contrast is, as Mr. Lawson acknowledges, much stronger than one between the United Kingdom and the Dominion. It is somewhat striking, therefore, to be told that despite the wide and essential disparity of area and condition the railroad mileage of Canada to-day is so nearly the same as our own—24,104 miles to 23,280 here. There the similarity ends, for the Canadian railway system represents a capital investment still less than a fifth of our own. That British railways earn four times as much per mile as Canadian will surprise no one who weighs the population and trade concerned. Nor does the calculation that the working expenses in Canada run to 72 per cent. of gross earnings compared with 62 per cent. here seem strange. Perhaps Mr. Lawson's critic might say that in his strictures on intruding political influences he scarcely attaches enough weight to the domination of political necessities and purely business requirements in the opening up of a practically unpeopled area by railway enterprise. No doubt the political aspect of the matter may be and has been overdone in some cases. The picture of the success of the Canadian Pacific Railways—when the politicians, after a ten years' fight among themselves, had to call business men to the rescue—is contrasted with the unremunerative expenditure on the Inter-colonial line. Mr. Lawson rightly warns Canadians that explanations are needed, not there only but in some other respects, on what he goes so far as to call the "running sore" of the "political" railroads of the Dominion.

Much stress is laid in the chapters dealing with Canadian growth on the "gift" of 3,000,000 square miles of territory in the north-west which the Dominion owes directly to the Imperial Government, and which taken in conjunction with the strength of the European market for cereals in recent years has made possible the realisation of the "Twentieth Century Canada" as we know it to-day.

The discussion which Mr. Lawson offers on the relative growth of Canada's financial credit and Canada's actual production forms a very interesting section of this work, and warning is given that a supremely vital question may arise where credit values run too far ahead of commodity values. In the tabular contrasts of productive growth, agricultural, industrial and commercial, are offered a set of statistical records (pp. 270—272) which will repay more elaborate analysis than a reviewer can undertake. Suffice it here to note the very different ranges of percentage growth between 1885 and 1909. Large as the development of her agricultural industry has proved—the wheat and oat production, giving the two largest items of increase, with a ratio exceeding 400 per cent. and with a wheat export in a far higher proportion—the growth of mining exports runs up still more quickly and exceeds 900 per cent. since 1885. There is room for criticism, however, in the form of the tables offered here, and some misprints which should be corrected in a fresh addition—as where "annual" exports are recorded where "animal" exports are meant. One or two minor slips may be suspected in a few of the big figures quoted in other sections, while here and elsewhere a more frequent contrast of groups of years in place of single years would be welcome. The striking figures as to the proportion of foreign and of British investments in Canada and the vast expansion of banking credit deserve attention. Mr. Lawson pays a tribute of admiration to the prudence which on the whole has distinguished Canadian banking arrangements, which he contrasts favourably with those of the United States. Mr. Paish's recent researches pointed to over 300,000,000*l.* sterling of British capital in Canada, and to this the author refers as well as to the inquiries of the editor of the *Toronto Monetary Times* on the later course of Canadian borrowings. The stimulating part which British capital has played in Canadian development is well enforced in these pages, and Mr. Lawson insists that it is on the money the Dominion borrows that we can and do give her an effective and more valuable preference than any we could offer on her grain or her provisions. Indeed, he tells us by financing Canadian enterprises at exceptionally low rates we repay ten times over the 33 per cent. (nominal) preference allowed on our exports.

Into the constitutional questions here discussed and the tariff arrangements of the past and future the statistical reviewer is hardly justified in entering, but in the closing appeal of the volume for the representation of our colonies in the Imperial Parliament, it may be noted the writer quotes the suggested solution of Benjamin Franklin as long ago as 1767, when the British statesmen of that day had failed to grasp the grievance of the revolted American colonies. In his own plea for a new and larger federation of the Empire, Mr. Lawson seems to contemplate the direct representation of the over-sea dominions of the Crown by the transition of the House of Lords into an Imperial Council. P.G.C.

5.—*Insurance science and economics: a practical discussion of present-day problems of administration, methods and results for insurance officials, managers, agents, merchants, lawyers, teachers, students and others interested in the broader aspects of insurance as a business in its relation to public welfare and the State.* By Frederick L. Hoffman. xiii + 366 pp., 8vo. New York: The Spectator Company, 1911. Price $3.

The author of this treatise is a Fellow of our Society and is President of the American Statistical Association. He has had experience in the administration of assurance business as an officer of the Prudential Assurance Society of the United States, and his experience has convinced him that there is a great lack of proper insurance education on the part of those engaged in the business of assurance. His aim, as indicated in the rather lengthy title page which we have copied above, is to supply that lack by a text-book similar to those which have been published in the German and French languages.

His consideration of life assurance as a science is comprehensive. He not only lays its foundation soundly in mathematics, but also brings into service nearly the whole round of the sciences, and traces it from biology to such modern developments as neurology, pædiatrics, anthropology and anthropometry. He also discusses the position of insurance in the science of law, the legislation upon State supervision, and the history of insurance as a chapter in economic science and as an element of commerce.

Mr. Hoffman complains that the place of insurance in Economics has not been clearly defined by the authorities. He considers that it naturally belongs to the division of economic theory that deals with the phenomena of the production of wealth. Its connection with production, however, cannot be other than indirect. Insurance, which diminishes risk of loss to individuals by spreading it over communities, does not create any new wealth. To the extent, however, that it retains in economic efficiency persons and concerns that without it would have been destroyed for any useful economic purpose, and sets them free to produce future wealth with unimpaired credit, its operation, though indirect, cannot be said to be remote, for the result almost necessarily follows.

From the point of view of the creation by insurance of a new degree of security, its importance as an element of commerce came very early to be recognised. It converts a speculation which might result in total loss into a certainty of gain, slightly less than the speculative profit that had been hoped for. Mr. Hoffman finds evidence of the origin of marine insurance in ancient maritime usages, and quotes the laws of Wisby in 1288 as the first in which it is referred to as an established commercial practice. These and the earlier laws of Oleron are the foundation of our jurisprudence on the matter to the present day.

In his chapter on the origin and growth of law and legislation on insurance, the author quotes the principles which have been laid down in this country as distinguishing this contract from most others expressed in the quaint term *uberrima fides.* Our earliest restrictive legislation was levelled against wagering and gambling policies in 1746 and 1774. It is noted as evidence of the extent of the traffic in insurances between the mother country and her then colonies that in the Act of 1746 America is specifically mentioned.

An interesting chapter follows on life insurance supervision and Government control in Germany, being a reprint of an address delivered by the author at the annual convention of insurance commissioners held in Richmond, Va., in 1906. His conclusion is that the Government regulation of insurance in Germany is simple and effective, the complete supervision of the companies being obtained at a minimum of interference and expense.

From this he proceeds to consider the taxation of life insurance interests, which he holds to be a tax upon thrift and contrary to public policy. The annual taxes on life insurance in the United States exceed $12,000,000, and to tax the class of people who by insuring their lives benefit those who are to live after them is "a tax upon a tax, and consequently barbarism." The tax is increasing, being now, in proportion to premium, three times what it was fifty years ago. Mr. Hoffman looks at it from every point of view, and condemns it.

His eighth chapter deals with the English Assurance Companies Act of 1909, which he considers as in many respects an innovation, and as being an incomplete piece of legislation, some of its provisions having received only a hurried consideration during the closing stages of the session of Parliament in that year.

The final chapter deals with the law of average, and is intended to emphasize the importance of general statistical results as a basis for conduct in the everyday affairs of life, but not as a scientific outline of the mathematical or statistical theory. For this the author refers his readers to the treatises of Mr. T. E. Young, Mr. Bowley and others. Every chapter of the book is supplemented by a full bibliography, which cannot fail to increase its usefulness to the student, to whom we commend it as a thorough piece of good work, fully carrying out the intentions of the author in undertaking it, and likely to be of great value to the classes for whom it is specially intended, as well as to the great body of insured people, who will find much to interest them in it. E.B.

6.—*The living wage of women workers: a study of incomes and expenditures of* 450 *women workers in the city of Boston.* By Louise Marion Bosworth. Edited, with an introduction, by F. Spencer Baldwin, Ph.D. Supplement to the Annals of the American Academy of Political and Social Science. 90 pp., 8vo. Philadelphia, 1911.

"In general, the investigator has been surprised by the accuracy and detail with which women, especially those on low wages, are able to recall their earnings and expenditures. In some cases the recollection has been very complete . . . Doubtless the statements of expenditures on some of the schedules are only approximate. Inaccuracies, however, probably occur chiefly under the headings of miscellaneous expenditures."

Miss Bosworth herself interviewed 200 of the workers represented on the schedules, and her report is full of illuminating information to the English student. "Here (*i.e.*, in the dining rooms of the larger 'homes' for working women) board is $3 per week for girls not rooming in the house, as well as for inmates. Single meals may be had separately at any time at a cost of 15 cents. each for breakfast and lunch and 25 cents. for dinner." The recommendations of these dining rooms "seemed to indicate standards of living very much to be deplored, since they allow satisfaction with such food in such surroundings." "Only 80 of the total of 191 rooms reported are furnace heated; 17 are warmed by coal stoves, 8 by oil stoves, 86 have no heat whatever." "The average cost of clothing varies only between $1 and $2 a week approximately."

The frequent generalisation on a statistical basis not fitted for the purpose, however, calls for detailed criticism. "The number of schedules giving returns for clothing, which was about the average number in the different divisions of the investigation, was 399," distributed as follows:—

Occupations.		Wage groups.	
Professional	37	$3 and under $6	51
Clerical	143	$6 ,, $9	185
Sales	49	$9 ,, $12	102
Factory	88	$12 ,, $15	36
Waitresses	64	$15 and over	25
Kitchen	18		

The returns are tabulated under these two headings without any indications of the numbers to which each sub-division relates, although it is clear from the passage quoted that they do not refer to 450 persons throughout. Although several of the workers lived at home their returns are not tabulated separately and no indication is given of their numbers in any group. "Waitresses and kitchen workers appear to spend a larger amount for regular meals than do sales and factory girls. But it should be noted that the figures of food expenditures for these classes are only estimates; meals included in wages are reckoned at the rate of $3 per week for three meals." "The presence of kitchen workers in the class paying the higher rent seems strange. The explanation is found in the fact that most kitchen workers are not young girls; they are usually middle aged women, and a large percentage of them have others dependent on them."

On p. 49 we are told that the personal standards of the sales girls are "evidently influenced by the attractive goods which they often deal in, for their percentage of expenditure for rent is extremely high—22·3 per cent., or almost one-fourth of their income." But on p. 52 we find that "the clerical division shows only 13 out of 62 reporting no room-mate, 30 share their room with one, 19 share with two or more. Sales girls in this respect apparently preserve a much more adequate standard. 31 out of 52 report a room to themselves."

None of these disturbing factors are made clear in the summary tables.

If the returns classified according to wages actually earned were sub-divided into groups separating those living as members of families, those living alone, and those living with one or more companions, the results of this painstaking inquiry would form a very solid contribution to the literature of this subject. C.E.C.

7.—*Le Commerce Extérieur et les Tarifs de Douane.* Par Aug. Arnauné. iii + 534 pp., 8vo. Paris: Félix Alcan, 1911. Price 8 fr.

The object of this book, as the writer states in his Preface, is to explain the circumstances under which successive French policies of the treatment of commodities of external origin in the matter of customs duties have been established, to set forth with precision the distinctive characteristics of each different *regimé*, and to ascertain and present the results to which they have respectively led. Professor Arnauné started, or at any rate he has brought to a conclusion, this careful and informing study, with the belief that a comparison, such as he has made, in dealing with a system that has been throughout protective in less or greater measure, although the degree and range of the protection intended or achieved by the French tariff for French products has exhibited variations, which have been both considerable and significant at different times, is not favourable to that policy. The actual consequences secured do not in his opinion compare advantageously with the effects designed by such a tariff. Indeed he has no doubt of the pertinence of a moral, which should also be borne in mind by the readers of his treatise, if they would take into due account any bias by which their author may have been influenced avowedly or unconsciously; for he considers that his investigations justify him in asserting that Protection does not possess the practical superiority which it has claimed, that the solutions it has put forward are not fitted to the facts, and that, so far from being adapted to a country such as France, it actually prevents the French nation from taking the place in the production and the trade of the world which should properly be assured by the exceptional wealth of industrial capacity and capital which is at its command.

Professor Arnauné then must be described as an unfriendly critic rather than a favourable reviewer of the fiscal history which he narrates. But he is at pains to show that the story unfolded can only be correctly appreciated if we distinguish with care the separate phases in the particular development of a theme which supplies the general motive from the first chapter to the last. At the outset French Protection was confined to manufactures only; and it was directed especially against England, then (in the seventeenth and eighteenth centuries) the only rival of France in industry and trade. Our author is punctilious in indicating the real nature of that Colbertism from which French fiscal policy may rightly be considered to have sprung, and to which at later seasons it has tended to return. The general idea of Colbert was, as he urges, a moderate protection of industry, combined with free importation of food products, and of the raw materials which that industry required. To-day the maxims on which French Protectionists base their arguments are in essence not dissimilar from those employed by Colbert. The balance of trade is still a factor of the situation to which appeal is being made; and now, as then, it is contended that the protection of a customs tariff will increase the quantity of work which the nation will be able to secure and to provide for its own members. But nevertheless at different times a moderate scale of duties has been pushed to the extreme length of prohibition; although it was not until the period of the Restored Monarchy that the principle that prohibition should be uniformly applicable led to a positive veto on the entry into France of the majority of the considerable industrial products, and to the extension of the policy of protection to French agriculture. Similarly, as M. Arnauné argues, it is a misunderstanding of the facts to suppose that in 1860 a *régime* of free trade was inaugurated. What occurred should rather be described as a reversion to the practice of 1795, and to the ideas of Colbert. Industrial prohibition and agricultural protection were replaced by a moderate protection of industry, and by the free admission of food and raw materials. Since then we have seen the re-introduction of agricultural protection, and successive increases, in 1881, in 1892, and in 1910, in the rate of the duties levied to protect French manufactures.

This clear and definite separation into different epochs is one prominent feature of M. Arnauné's narrative; another characteristic, connected with this trait, is his full account of the views advanced by economists of repute who have criticised the contentions, and as they themselves and our author hold, have demonstrated finally the errors, and exposed once for all the ridiculous absurdities, of Protectionists. Perhaps he is inclined to attach too much rather than too little weight to the influence exerted in the domain of practical affairs by such writing, which must obviously move mainly in the sphere of scientific speculation and of systematic theorising. But no competent historian of economic thought and fiscal administration will dispute the possibility, or question the reality, of their mutual relations. At any rate our author holds that the treaty of 1786, by which English merchandise was admitted into France, was rendered possible, or at least the way for this amount of recognition of free trade was opened, by the discussion of Mercantilism which Quesnay in his own country and David Hume and Adam Smith in the United Kingdom had undertaken. The later treaty of 1860 is similarly attributed, not without some reason, to the teaching of J. B. Say and his disciples, and to the brilliant and persuasive propaganda of Frederic Bastiat. Professor Arnauné makes no secret of the fact that he has given a special chapter to the account of the customs reforms effected in England, both because of their intrinsic interest and importance, and also because of the reflex influence exerted by these financial changes on French policy. That policy, in each successive phase of its development, he considers under four main headings, which relate (1) to the general tariff, (2) to commercial treaties and conventions, (3) to the colonial system, and (4) to the department of the mercantile marine. L.L.P.

8.—*Cours Élémentaire de Science des Finances et de Législation Financière Française.* Par Gaston Jèze. Nouvelle Édition. Premier Fascicule, xxviii + 528 pp. Deuxième Fascicule xxix-xxxviii + 529-988 pp., 8vo. Paris: V. Giard et E. Brière, 1909 and 1910. Price 12 fr. 50 c.

This authoritative manual is designed for the use of students of the French "Facultés de Droit," and of candidates for employment in the Ministry of Finance, in the "Cour de Comptes," and in the general financial surveillance of the country. It is, so far as we are able to judge, suited for its purpose. Its plan may be commended for appropriateness and intelligibility. It is certainly comprehensive; and no department of the large subject which is embraced within its scope has, we think, been neglected. Nor have we discovered any serious detailed errata; although it is perhaps scarcely possible that in spite of the revision accompanying successive editions—that before us is the fourth—they should be entirely absent from so extensive and so minute a treatise. Professor Jèze confesses indeed —and the admission is no less honourable to him than it will probably be consoling to his readers—to an apparent conflict between his preaching and his practice. For he has been careful to lay down the admirable principle that theories, which are themselves the product of circumstances that are continually undergoing change, as we pass from one country to another, and as we move from period to period, should not be regarded as definitive, however sure and solid they may seem, and however incontrovertible they may appear to be at any one moment or in any single place. And yet in his own practice he allows that he may on occasions have given an absolute value to contentions that have enjoyed his personal preference. Even in the more certain sphere of positive law, and on the firmer ground of the actual recorded history of institutions, the need for conciseness has, he admits, sometimes betrayed him into an excess of rigidity. But nevertheless no one could have stated more plainly than he has done the reasons why financial procedure is always changing. Peoples and generations have their preferences, it is obvious; and the problems to be solved are rarely, if they are ever, identical in every State. All theories of taxation aim probably at the realisation of justice; but the conception of justice alters, and in fact the conscious or unconscious influence of class interest cannot be eliminated. Still, despite of these causes of variation, a certain measure of stability, which it is the purpose of this treatise to discover and present, has come to be attached to such matters as are handled here, of budgetary procedure, of official accountability, and of the administration of the public debt.

The opening section of the manual is devoted to the methods of account-keeping used both by central States and by local or subordinate authorities. The general theory of the Budget, treated first from a financial, then from a legal, and lastly from a political standpoint, is set forth, and its historical origin in various countries is described. To this description succeeds an inquiry into the part played by the different organs of administration and legislation in the management of the finances of a nation, and of course especially of France, with whose arrangements the whole treatise is mainly concerned. The period which the Budget covers, its contents and its forms, the methods of making, and the means of checking, the payments required to meet public expenditure, the processes by which the receipts due to the State are collected, the organisation of the Treasury and its agents, the nature and extent of the control exerted over the financial operations of State officials, and the way in which the necessary and effective checks have been devised, and are used, to make responsible officers account fully or satisfactorily for the incoming revenue and the outgoing expenditure, are examined with illustrative detail. With Book II we pass to the subject of public expenditure, where Professor Jèze notes the fact, and furnishes some probable explanations, of that large increase which is a noticeable feature of the age in which we live. The principal objects of expenditure are here investigated. In the third Book the public credit and the public debt form the topic of inquiry; and in the fourth Book, with an investigation of the sources of public revenue, we enter on the discussion of taxation and its principles; and this large question occupies in fact the second volume. Here, as elsewhere, our author has consulted a wide range of economic literature; and yet he has contrived to compress into a space conveniently concise a summary of his researches. He does not refrain from passing judgment on some debated issues, and all his readers therefore will probably not assent to all his verdicts. But they will, we are sure, recognise the great peril of differing from one who is so evident a master of the large erudition utilised for the production of these two considerable volumes. L.L.P.

9.—*Other New Publications.**

[These notes do not preclude a fuller review in a later issue of the Journal.]

Bachi (*Prof. Ricardo*). L'Italia Economica nel 1910. Annuario della vita commerciale, industriale, agraria, bancaria, finanziaria, e della politica economica. Anno II. 222 pp., 8vo. Torino, 1910. Price 3 lire 50 c.

[A useful compilation of the most recent economic and statistical information as regards the commerce, industries, agriculture and finance of Italy during the past year. There is also a bibliography of official and unofficial publications issued during the year.]

Boag (*Harold*). Compound interest, Annuities-certain, and Logarithmic calculations . . . 90 pp., 8vo. London, 1911. Price 2*s.* 8*d.*

Canovai (*Tito*). I limiti della circolazione cartacea nella teoria, nella practica e nella legislazione. 96 pp., 8vo. Montegiorgio, 1911.

Deslandres (*Maurice*). L'Acheteur. Son rôle économique et social. Les ligues sociales d'acheteurs. vii + 507 pp., 8vo. Paris: Felix Alcan, 1911. Price 8 frs.

[An account of the foundation and spread of consumers' leagues, the object of which is to better the social conditions of employees and workers by withholding their custom from firms whose treatment of their employees is not generally considered fair. The movement has spread rapidly in America and Europe, and has resulted in many benefits being secured for workers. It is a striking example of the power of individual effort to extend social progress.]

Fisher (*Irving*). The Equation of Exchange, 1896-1910. 12 pp., 8vo. 1911.

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* See also "Additions to the Library," page 877, *sqq.*

Fürer (*Rudolf von*). Die Gestaltung des Arbeitsmarktes. (Studien über den Arbeitsmarkt. Band. 1.) 174 pp., 8vo. Wien: Reichsverband des Allgem. Arbeitsvermittelungsanstalten in Oesterreich. 1911.

[A statistical and economic study of the present state of the labour market, principally in Austria, dealing with the conditions of manual labourers, and those employed in industries and in agriculture. There are chapters on unemployment and on the means of relieving the unsettled conditions at present in existence in labour circles.]

Guyot (*Yves*). Les Chemins de Fer et la Grève. xiv + 329 pp., sm. 8vo. Paris: Felix Alcan, 1911. Price 3 frs. 50 c.

[The author in this study on the recent railway strike in France divides his subject into seven books. The first deals with the conditions existing before the strike, in which mention is made of two strikes in 1891, with which M. Guyot as Minister of Public Works had to deal, and which, owing to his prompt action, were quickly settled. The author also discusses the need of legislation to meet existing conditions; the pensions paid to railway employees; and existing and past legislation in regard to transport strikes in force in other countries, in which it is shown that the right to strike is kept within reasonable bounds in most countries. As regards the statement that the ownership of railways is in the hands of the few, the author shows that the owners of less than ten shares are in the majority; and that the railways are in fact owned by a financial democracy. The question of the treatment of workers dismissed in connection with the strike, and of the forfeiting of their pensions, is discussed.]

Irishman (*An*). The Financial Relations of Ireland with the Imperial Exchequer. [Anon.] 39 pp., 8vo., 1911. Dublin: Gill and Son. Price 6*d.* net.

[The writer of this pamphlet thinks that the financial relations of Ireland with the Imperial Exchequer should be above party politics. In discussing the question he criticises the Treasury returns, which, he considers, give a wrong impression as to the amounts contributed by Ireland.]

Kettle (*T. M.*). Home Rule Finance. An experiment in justice. viii + 96 pp., 8vo. Dublin: Maunsel and Co., Ltd., 1911. Price 1*s.* net.

[A study from the Nationalist point of view of Home Rule Finance. The author thinks that the only avenue of approach to that financial problem is through the Financial Relations Report of 1896.]

Liszt (*Dr. Eduard Ritter von*). Die kriminelle Fruchtabtreibung. 2 vols., 8vo. Zurich: Art Institut Orell Füssli. Price 20 frs.

[A legal study of criminal abortion in different countries and of the laws for its prevention and punishment in force therein.]

Richards (*H. Meredith*). Public Health and National Insurance. 71 pp., 8vo. London: P. S. King and Son. 1911. Price 6*d.* net.

[The standpoint of the author, who is Medical Officer of Health of Croydon, is not simply that of an administrator. His work in other directions enables him to appreciate not only the limitations, but also the difficulties of general practice and sickness insurance. The opinions expressed are based on personal observation in different localities.]

Ross (*Agustin*). Chile: 1851-1910. Sixty years of Monetary and Financial Questions and of Banking Problems. 238 + iv pp., 8vo. Valparaiso, 1910.

Schooling (*John Holt*). The British Trade Book. A survey of home production and industries of United Kingdom, &c. Fourth issue. La. 8vo. London: John Murray, 1911. Price 10*s*. 6*d*.

[The present issue of this book brings up to date the useful tables contained in earlier editions, together with much additional information available as a result of new investigations. The continuous decennial-average plan is followed throughout in the tables.]

Sellar (*A. S.*). Layton's Simple Interest Tables at 1 per cent. on amounts ranging from 1*l*. to 100,000*l*. for intervals of 1 day up to 365 days, and for intervals of 1 month up to 12 months. 8vo. London: C. and E. Layton, 1911.

Stevens (*Alfred*). The wide range income-tax calculator. . . 8 pp., 8vo. London: E. and F. N. Spon. 1911. Price 1*s*. net.

Zahn (*Dr. Friedrich*). Deutschlands Wirtschaftliche Entwicklung unter besonderer Berücksichtigung der Volkszählung, 1905, sowie der Berufs- und Betriebszählung, 1907. 206 pp., 8vo. Berlin: J. Schweitzer Verlag. 1911.

[An interesting statistical study of the economic development of Germany generally from 1871, based largely on the several great industrial censuses that have been taken in that country.]

Zahn (*F.*) *Editor*). Die Statistik in Deutschland nach ihrem heutigen Stand. Georg von Mayr bei der Feier seines 70 Geburtstags am 12 Februar, 1911, als Ehrengabe dargebracht von A. Arnold . . . und F. Zahn (zugleich Herausgeber). Bands 1 and 2. 2 vols., 8vo. Munchen: J. Schweitzer Verlag, 1911.

[This comprehensive work has been compiled in honour of the 70th birthday of Dr. Georg Von Mayr, sixty contributors having supplied chapters on different phases of statistical inquiry.]

Institut International de Bibliographie. Publication No. 109. La Statistique Internationale des Imprimés. 133 pp., 8vo. Bruxelles. 1911. Price 3 fr.

[This interesting compilation consists of two parts. The first deals with the general statistical returns of the number of books and periodicals that have appeared in different countries as far back as can be ascertained. The second part deals with the best methods to be followed in order to obtain statistical data which shall be uniform and comparable. Some model forms of tables are appended.]

Argentine Year Book for 1910. 428 pp., 8vo. London: W. H. Smith and Son. 1911. Price 10*s*. 6*d*. net.

[A useful compilation of general and statistical information concerning Argentina. The statement of the average rate of wages of various trades, with their hours of labour, and the chapters on the frozen meat and other industries may be specially mentioned.]

CORRESPONDENCE.

Age and Unemployment.

To the Editors of the "Journal of the Royal Statistical Society."

SIRS,—A cursory examination of some figures relating to the age distribution of applicants seeking assistance under the Unemployed Workmen Act, 1905, has led to the following closer examination being made.

The data have been obtained from the Parliamentary Return relating to the proceedings of Distress Committees in England and Wales and of the Central (Unemployed) Body for London during the year ended 1906, the Census Returns 1901, and the report of the Royal Commission on the Poor Laws.

In columns (1) and (2) of the accompanying table are given particulars relating to the age distribution of unemployed applicants qualified for assistance under the Unemployed Workmen Act, 1905. As the age-groups given in the Parliamentary Return are dissimilar to those in the Census Returns the numbers have been interpolated so that comparison might be made. The interpolated figures are given in columns (3) and (4).

The occupations of these applicants were as follows:—

	Percentage of total of all occupations.
General or casual labour	52·2
Building trades	17·7
Engineering, shipbuilding and metal trades	6·8
Boot and shoe making	2·4
Furniture and woodwork	1·6
Total	80·7

For the purpose of comparison the following trades were selected from the Census Returns 1901:—

	Proportion per cent. of total.
Building trades	28·9
Engineering	20·6
Metal workers	5·7
Ships and boats	3·0
Vehicles	2·6
Carmen, coachmen, &c.	13·4
Wood workers	6·9
Boot and shoe making	5·6
General and factory labourers	13·3
Total	100·0

These figures were extracted for the aggregate of urban districts only, the operations of the Unemployed Workmen Act being

TABLE I.

1	2	3	4	5	6	7	8	9	10	11
Age distribution of unemployed.					Age distribution of those engaged in certain selected industries in the aggregate of urban districts, census returns, 1901.				Proportion of unemployed per 1,000 of population in selected industries.	Ratio of male paupers per 1,000 of population in 1906 at each age-group.
Ages.	Number.	Ages.	Number as redistributed in age-rgoups of previous column.	Percentage of total of all ages.	Ages.	Number.	Estimated number in middle 1906.	Percentage of total of all ages.		
Under 20	2,318	15—19	2,083	3·4	15—19	384,197	405,597	14·4	5·1	1·7
20 and under 30....	15,953	20—24	7,539	12·5	20—24	399,652	422,175	14·8	17·8	1·6
30 „ 40....	17,174	25—34	17,161	28·4	25—34	659,534	724,509	25·5	23·6	2·9
40 „ 50....	13,930	35—44	16,627	27·5	35—44	519,954	568,830	20·0	29·2	5·8
50 „ 60....	7,998	45—54	9,975	16·5	45—54	380,098	414,307	14·5	24·7	11·4
Over 60	3,025	55—64	6,152	10·2	55—64	213,099	230,317	8·2	26·7	28·7
		65—74	861	1·5	65—74	72,772	75,428	2·6	11·4	70·3
Totals	60,398	—	60,398	100·0	—	2,629,306	2,841,163	100·0	21·0	—

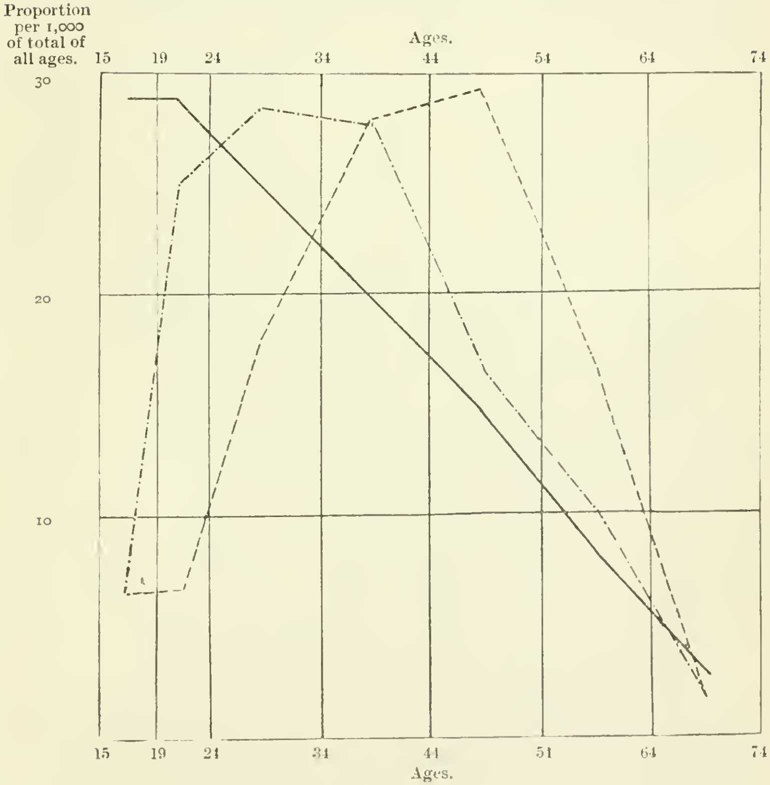
confined to municipal boroughs and urban districts. The total number of individuals engaged in these selected industries was 2,629,306, and the age distribution was as set out in column (7) of the accompanying table. On the assumption that the same rate of increase per cent. in the ten years 1891-1901, in each of the given age-groups, has operated during the years 1901-1906, these figures have been amended, and in column (8) is given the estimated numbers employed in the selected industries in the middle of 1906.

In Diagram 1 these figures have been plotted out, and it can be seen that the age distribution of the unemployed is materially different from that of the selected industries.

DIAGRAM 1.

Age-distribution of:—

(a) *Those engaged in certain selected industries* ————
(b) *Unemployed* - · - · - · -
(c) *Able-bodied male paupers* - - - - - -



In the report of the Royal Commission on the Poor Laws the following table is given, showing the age distribution of "able-bodied" men in receipt of in-door and out-door relief on March 31, 1906:—

Age group.	Number.	Proportion per cent. of total of all ages.
16—19	595	3·3
20—24	612	3·4
25—34	3,295	18·1
35—44	5,067	27·9
45—54	5,279	29·1
55—64	3,062	16·8
65—74	231	1·3
75 and over	22	0·1
	18,163	100·0

These figures are also plotted out in Diagram 1, and the following table compares the age distribution of those engaged in the selected industries, the unemployed and, finally, the able-bodied paupers:—

	Lower quartile.	Median.	Upper quartile.
Selected groups of industries	22·8	32·0	44·0
"Unemployed"	27·0	35·8	45·0
Able-bodied paupers	34·0	43·0	51·0

This series of figures read in connection with the diagram referred to seem to indicate that unemployment is a concomitant of increasing age. The figures relating to pauperism exclude the aged and there is no doubt that many of the applicants to Distress Committees ultimately find their way to the union.

In column (10) is given the proportion of unemployed per 1,000 of the estimated population in the selected industries at each age group. The proportion increases rapidly up to the age of 44 years, but then declines. In column (11) the proportion of male paupers per 1,000 of the estimated population in 1906 at each age-group is given. It will be noticed that the rate of increase is greatest at the point where the figures relating to unemployment decline. Diagram 2 brings out this fact clearly. Although the figures in column (11) include the sick and aged there can be no doubt as to the difficulty experienced on the part of men engaged in certain occupations to obtain employment as their age increases.

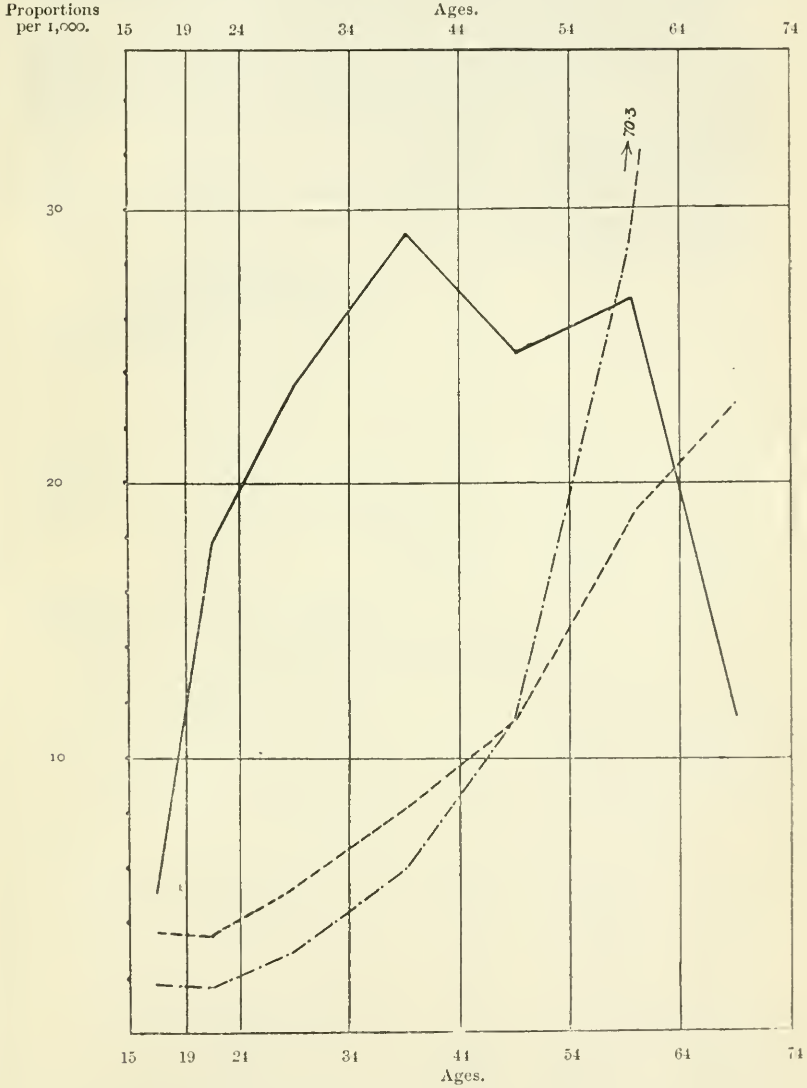
There are seemingly no data available which would enable a more close investigation of the matter to be made, but the following extracts from reports by the Actuaries advising the Government in connection with the Scheme of Insurance against Sickness and Unemployment are of particular interest in this respect.

DIAGRAM 2.

Proportion of unemployed per 1,000 *of estimated population in selected industries at each age-group* ———.

Proportion of male paupers per 1,000 *of estimated population in* 1906 *at each age-group* – · – · – · –

Age-distribution of male paupers. Proportions per 1,000 *of total of all ages* – – – – – –



The first report by Messrs. Hardy and Wyatt states, p. 19, para. 58—

"The average rate of unemployment amongst the general working community would probably be found to increase with the increase of age, but there are no means of estimating the progression. We have examined the rates of increase shown in some returns relating to certain small sections of the workers, but while in each case they showed a tendency for the rate to increase these special rates could not safely be applied to the general body of workers."

The report of Mr. T. Ackland states, p. 2, para. 3 (iii)—

"Certain data, mainly as regards particular engineering Unions in the year 1895, specifying the number unemployed in decennial groups . . . were investigated, and whilst they gave clear indications that the rate of unemployment tended to increase with the age of the workman, it was found that they would not yield any further useful information . . ."

There is no doubt that when this scheme is in operation the data will be collected, and will doubtless have effect upon the rates of contribution and benefit.

I am, Sir,
Your obedient Servant,
G. B. Morrison.

CURRENT NOTES.

The trade returns for the past month are on the whole satisfactory, although allowance must be made for the Whitsun Bank-Holiday and the Coronation holidays, the latter practically amounting to three days. Imports are reduced in value, but nearly one-fourth of the decline is due to the lower price of rubber, and exports show a considerable advance. As compared with June, 1910, there is a decrease of 3,523,928*l.*, or 6·4 per cent. in imports, and an increase of 1,313,496*l.*, or 3·7 per cent., in exports. Re-exports show an increase of 369,745*l.*, or 4·3 per cent. The figures for the twelve months ending June, 1911, are summarised in the subjoined tables :—

[000's omitted.]

Imports.	Twelve months ending June, 1911.	Twelve months ending June, 1910.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£	£	£
I. Food, drink and tobacco	251,079,	261,570,	− 10,491,
II. Raw materials and articles mainly unmanufactured	262,780,	239,445,	+ 23,335,
III. Articles wholly or mainly manufactured	161,732,	153,828,	+ 7,904,
IV. Miscellaneous and unclassified (including parcel post)	2,567,	2,620,	− 53,
Total merchandise	678,158,	657,463,	+ 20,695,
Imports of bullion and specie	63,292,	70,878,	− 7,586,

[000's omitted.]

Exports.	Twelve months ending June, 1911.	Twelve months ending June, 1910.	Increase (+) or decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£	£	£
I. Food, drink and tobacco	27,358,	24,388,	+ 2,970,
II. Raw materials and articles mainly unmanufactured	53,473,	53,133,	+ 340,
III. Articles wholly or mainly manufactured	360,160,	321,064,	+ 39,096,
IV. Miscellaneous and unclassified (including parcel post)	8,681,	7,246,	+ 1,435,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	13,828,	12,111,	+ 1,717,
II. Raw materials and articles mainly unmanufactured	61,665,	61,715,	− 50,
III. Articles wholly or mainly manufactured	27,666,	25,998,	+ 1,668,
IV. Miscellaneous and unclassified (including parcel post)	192,	284,	− 92,
Total, British, foreign and colonial	553,023,	505,939,	+ 47,094,
Exports of bullion and specie	59,642,	62,521,	− 2,879,

[000's omitted.]

Shipping (foreign trade).	Twelve months ending June, 1911.	Twelve months ending June, 1910.	Increase (+).
	Tons.	Tons.	Tons.
Total, British and foreign, *entered* with cargoes	41,998,	41,157,	+ 841,
Total, British and foreign, *cleared* with cargoes	58,537,	57,090,	+ 1,447,

Taking the six months ended June, 1911, the figures are as follows :—

	£	£	Per cent.
Imports	334,124,058	− 282,393	− 0·8
Exports	223,668,297	+ 19,082,574	+ 9·3
Re-exports	54,887,444	− 424,827	− 0·7

According to the Board of Trade *Labour Gazette*, the state of the labour market during May was as follows :—

	Trade Unions making returns.		Reported as unemployed.	
	Number.	Net membership.	Number.	Percentage.
May, 1911	395	766,990	19,431	2·5
April, 1911	395	764,548	21,407	2·8
May, 1910	416	703,439	29,787	4·2

Employment in May continued good. It showed some improvement, on the whole, as compared with April, and was considerably better than a year ago. The engineering, shipbuilding, furnishing and woodworking, woollen, worsted, hosiery, dyeing and bleaching and pottery trades were all well employed. There was a further slight recovery in the iron and steel industry, and a seasonal improvement in the clothing, building, and brick industries. On the other hand, the number of pig-iron furnaces in blast continued to decline, and there was some falling off in employment in the cotton, lace and jute trades. As compared with a year ago, however, employment at coal-mining was on the whole not quite so good, and there was a considerable decline at blast furnaces and in the lace and jute trades.

Mr. Sauerbeck's index number of prices in June is 80·0, as against 80·3 in May, the average of the eleven years, 1867-77, being taken as 100. The index number shows a slight reaction. Articles of food were well maintained, especially butter and sugar, and minerals experienced on the whole little change, but textiles were mostly weaker, viz., cotton, flax, jute, and wool. Articles of food were 74·5, as compared with 73·4 in May; and materials were 83·9, as compared with 85·3 in the previous month. Silver shows a slight fall. The *Economist* index number is 2,517, as compared with 2,540 at the end of June, thus showing a fall of 23 points.

In connection with Part II of the National Insurance Bill, the Labour Department of the Board of Trade has issued "tables showing the rules and expenditure of trade unions in respect of unemployed benefits, and also showing earnings in the insured trades" (Cd–5703. Price 2*s.* 8*d.*). The tables comprise an analysis of the financial rules of each trade union relating to unemployed benefits; the expenditure of each trade union in 1908 on the various kinds of unemployed benefit; the total expenditure and expenditure per head on unemployed benefits in each of the years 1900 to 1909 of each trade union in the insured trades; and the earnings in the insured trades in an ordinary week of 1906, classified by occupation and amount.

It was decided, at the last session of the General Assembly of the International Institute of Agriculture, to issue at intervals—if possible weekly—advance sheets and supplements to the Bulletin of Agricultural Statistics, in order that information as to crops and harvest, received shortly before or after the 15th of the month, may be brought before the public as early as possible. The first of these supplements was issued in connection with the June issue of the Bulletin, under the direction of Prof. Umberto Ricci.

The first Universal Races Congress is to be held at the University of London on July 26—29, with the object of discussing "in the light of modern knowledge and the modern conscience, the general relations subsisting between the peoples of the West and those of the East, between so-called white and so-called coloured peoples, with a view to encouraging between them a fuller understanding, the most friendly feelings, and a heartier co-operation." Particulars may be obtained from the Hon. Organiser, Mr. G. Spiller, 3, Adelaide Street, W.C.

The formation is announced of the "Deutsche Statistische Gesellschaft" as a branch of the "Deutsche Gesellschaft für Soziologie," under the presidency of Professor Georg von Mayr. The Secretary of the Society is Dr. Würzburger, of Dresden.

The issue of a new review dealing with social and economic questions has been undertaken by Dr. Heinrich Braun, under the title "Annalen für Soziale Politik und Gesetzgebung," and the first number appeared recently.

It is announced that Professor Karl Pearson has been appointed to be the first occupant of the Chair of Eugenics, established by the legacy bequeathed for that purpose by the late Sir Francis Galton.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Accountant, 1911—

July 1—The taxation of land values in relation to local rating: *Carver* (*W. S.*).

July 8—Compounding allowances for payment of rates: *Lambert* (*Roger D.*).

Accountants' Magazine. *July*, 1911—Vouchers and vouching: *Anderson* (*J. B.*).

Bankers' Magazine. *July*, 1911—The bankers' profits during the first half of 1911. Banks to facilitate the purchase of land. The fate of the Birkbeck Bank. London and Canadian bankers in conference: *Lawson* (*W. R.*).

Economic Journal. *June*, 1911—Insurance against sickness, invalidity, and old age in Germany: *Gibbon* (*I. G.*). Underemployment and the mobility of labour: *Heath* (*J. St. G.*). Taxation of unearned increment in Germany: *Cohn* (*Prof. Gustav*). Shift system on the Witwatersrand mines: *Lehfeldt* (*Prof. R. A.*). The Unemployment Insurance Bill: *Ashley* (*Prof. W. J.*). The Canadian reciprocity agreement: *Skelton* (*Prof. O. D.*). Local control and the income tax: *Cowcher* (*W. B.*). Agricultural wages in England and in India: *Wilson* (*Sir James*). Charge and recovery: *Freeman* (*Arnold*).

Financial Review of Reviews. *July*, 1911—Our "Drifting" policy in local finance: *Welby* (*Right Hon. Lord*). Lord Minto's appeal for Indian industries: *Lethbridge* (*Sir Roper*). How Roumanians invest their capital: *Xénopol* (*M. Nicolas*). The tariff question from a business point of view: *Boyd* (*R. Ralston*).

Journal of the Board of Agriculture. *June*, 1911—Progress of the sugar beet industry in Norfolk: *Sawyer* (*Walter E.*). Summary of agricultural experiments.

Journal of Department of Agriculture and Technical Instruction for Ireland. *April*, 1911—Investigations on potato diseases. Technical instruction in Newtownards. Salmon and trout culture. The rural exodus in France. Winter egg records.

Public Health. *July*, 1911—The National Insurance Bill: *Richards* (*H. Meredith*). Medical benefit, some notes on foreign experience: *Gibbon* (*I. G.*). Tuberculosis among the poor: *Buchanan* (*D.*).

Surveyors' Institution. *Transactions.* *Session* 1910-11. *Vol.* 43—

Part 12—The Mersey Dock Estate: *Young* (*Oswald W.*). Cheshire County Council small holdings: *McCracken* (*W.*).

June 19, 1911—The position of tenants on the death of an owner or the sale of an estate: *Sabin* (*J. Henry*).

UNITED KINGDOM—*Contd.*

United Empire. (*Royal Colonial Institute Journal.*) *June*, 1911—The new day in Rhodesia: *Boyd* (*Charles*). Sierra Leone and its commercial expansion: *Alldridge* (*T. J.*). Cotton-growing in German East Africa: *Hamilton* (*Louis*). The finances of Western Australia: *Moore* (*Hon. Sir Newton J.*).

UNITED STATES—

American Journal of Sociology. *May*, 1911—Sociological observations in inner China: *Ross* (*Edward A.*). Sociological appraisal of Western influence in the Orient: *Capen* (*Edward W.*). Some suggestions regarding the organisation of a department of Sociology in an urban university: *Cutler* (*J. E.*). Report on questionnaire of committee on teaching: *Chapin* (*F. Stuart*). The church and the city community: *Laidlaw* (*Walter*). Social control of the domestic relations: *Howard* (*G. E.*). Sociology and social surveys: *Riley* (*T. J.*).

Annals of the American Academy of Political and Social Science. *May*, 1911—Contains a series of papers by different authors dealing with political and social progress in Latin-America.

Bankers' Magazine (*New York*). *June*, 1911—Figuring interest in the savings bank: *Kniffin* (*W. H.*).

Bulletin of the American Economic Association. *No.* 3. *June*, 1911—Reciprocity and the farmer: *Hibbard* (*B. H.*). Financial cooperation and the Aldrich plan: *Cooke* (*Thornton*). Aldrich banking plan: *Scott* (*W. A.*). The Aldrich plan for monetary legislation: *Sprague* (*O. M. W.*). Recent reports on State and local taxation: *Seligman* (*E. R. A.*). The equation of exchange: *Fisher* (*Irving*). Reviews and titles of new books.

Journal of Political Economy. *June*, 1911—Railway regulation in Texas: *Haney* (*Lewis H.*). History of the State debt of Ohio: *Bogart* (*Ernest L.*). The labor party and the constitution in Australia: *Clark* (*Victor S.*).

Political Science Quarterly. *June*, 1911—A local study of the race problem: *Brooks* (*R. P.*). Southern non-slaveholders in 1860: *Thomas* (*D. Y.*). Government by judiciary: *Boudin* (*L. B.*). Tax apportionment in Oregon: *Gilbert* (*J. H.*). The Government of India: *Boggs* (*T. H.*). Record of political events: *Hayes* (*C. H.*) and *Sait* (*E. M.*).

AUSTRIA—

Statistische Monatschrift. *June*, 1911—Die Lehren der amerikanischen Einwanderungsstatistik: *Englisch* (*Dr. Karl*). Auszug aus dem Protokoll der Konferenz für Städtestatistik: *Palla* (*Dr.*). Der auswärtige Warenverkehr Bosniens und der Herzegovina im Jahre 1909 im Vergleiche zum Jahre 1908: *Pausinger* (*V.*).

FRANCE—

Bulletin de Statistique, Ministère des Finances. *May*, 1911—Les contributions directes et taxes assimilées en 1910. L'impôt sur les vélocipèdes en 1910. Suisse.—La banque nationale en 1910.

FRANCE—*Contd.*

Journal des Economistes. June, 1911—Le régime de l'abonnement: *Guyot* (*Yves*). Les difficultés d'application de la loi sur les retraites ouvrières et paysannes: *Bellom* (*Maurice*). Le protectionnisme et le coût de la vie dans les familles ouvrières: *Paturel* (*Germain*). La dépopulation: *Nouvion* (*Georges de*). La circulation de banque aux États-Unis: *Lévy* (*Raphaël-Georges*). Revue de l'Académie des sciences morales et politiques (du 15 Février au 15 Mai, 1911): *Lefort* (*J.*). Travaux des chambres de commerce et des congrès: *Rouxel* (—). Mouvement scientifique et industriel: *Bellet* (*Daniel*). Nécrologie: M. Maurice Rouvier: *Guyot* (*Yves*).

Journal de la Société de Statistique de Paris. June, 1911—La loi du 14 Juillet, 1905, sur l'assistance aux vieillards, aux infirmes, et aux incurables; ses premiers résultats, sa répercussion sur les autres modes d'assistance: *Bernonville* (*Dugé de*). La statistique à un entrepôt de tabacs: *Malzac* (*M.*).

La Réforme Sociale. June 16, 1911—L'infiltration étrangère en France et ses conséquences sociales: *Cilleuls* (*Alfred des*). Le bien de famille: *Vattier* (*Joseph*). Une doctrine nouvelle; le régionalisme: *Mihura* (*Jules*).

Revue d'Économie Politique. May-June, 1911—La conception matérialiste de l'histoire d'après Marx et Engels: *Turgeon* (*Charles*). Une nouvelle évolution des moyens de transport du canal au chemin de fer: *Bellet* (*Daniel*). Les trois notions de la productivité et les revenus: *Aftalion* (*Albert*). Chronique budgétaire et fiscale; le projet de budget de 1911: *Allix* (*Edgard*). Chronique législative.

GERMANY—

Archiv für Rassen- und Gesellschafts-Biologie. March-April, 1911—Experimentelle Untersuchungen über die Vererbung der durch Ischiadicusverletzung hervorgerufenen Brown-Séquardschen Meerschweinchen-Epilepsie: *Maciesza* (*Dr. Adolf*) und *Wrzosek* (*Dr. Adam*). Ein Versuch zur Erklärung der gynephoren Vererbung menschlicher Erkrankungen: *Plate* (*Dr. L.*). Lebende Drillinge und Vierlinge: *Weissenberg* (*Dr. S.*). Volkserneuerung: *Grassl* (*Dr.*). Die Rassenidee und die liberale Weltanschauung: *Siebert* (*Dr. F.*).

Jahrbücher für Nationalökonomie und Statistik (*Conrad's*). *June,* 1911—Stadtverfassung und Zünfte Freiburgs im Breisgau: *Ehrler* (*Joseph*). Gibt es bei David Ricardo eine absolute Grundrente: *Diehl* (*Karl*). Die wirtschaftliche Gesetzgebung des deutschen Reiches im Jahre 1910. Einige Bemerkungen und Mitteilungen zur Frage der Selbstversicherung gegen Brandschäden: *Most* (*Otto*). Bericht über die Verhandlungen der 29. Jahresversammlung des Deutschen Vereins für Armenpflege und Wohltätigkeit am 23. und 24. September 1909 in München: *Landsberg* (—). Die Brotpreise in Berlin im Jahre 1910: *Guradze* (*Hans*).

GERMANY—*Contd.*

Vierteljahrshefte zur Statistik des Deutschen Reichs. Heft 2. 1911—Die Finanzen des Reichs und der deutschen Bundesstaaten (1910 und 1908). Krankenversicherung in den Knappschaftskassen und vereinen 1909. Die Erzeugnisse der Bergwerke, Salinen und Hütten 1910. Vorläufige Mitteilung. Auswärtiger Handel 1910. Verkehr im Kaiser Wilhelm-Kanal 1910. Schlachtvieh und Fleichbeschau 1910. Reichstagswahlen von 1907 (Nachtrag).

Zeitschrift des Königlich Preussischen Statistischen Landsamts. 1911. *Abteilung* 2—Die preussischen Sparkassen einzeln und in ihrer Gesamtheit im Rechnungsjahre 1909: *Evert* (*G.*).

Zeitschrift für Socialwissenschaft. Heft 7. 1911—Wirtschaft und Recht: *Voigt* (*A.*). Die Organisationen der Landarbeiter in Italien und die Arbeitskämpfe in der Romagna: *Marchetti* (*Livio*). Soziale Klassenbildung in Japan: *Heber* (*Ernst A.*).

Zeitschrift für die gesamte Versicherungs-Wissenschaft. July, 1911—Die künftige englische Sozialversicherung: *Manes* (*Prof. Dr.*). Verlängerung der Lebensdauer: *Rahts* (*Prof. Dr.*). Die Sterblichkeits- und Invaliditätsverhältnisse des Lokomotivpersonals deutscher Eisenbahnen: *Braun* (—). Der Selbstmord als mitversichertes Ereignis der Todesfallversicherung: *Rothauge* (*Dr.*).

ITALY—

Giornale degli Economisti e Rivista di Statistica. May, 1911—Gli scioperi agrarii nel Ferrarese: *Trevisonno* (*N.*). Note di economia induttiva. Sulla distribuzione dei redditi: *Mortara* (*G.*). Intorno a un teorema sulla applicazione delle medie statistiche: *Vecchi* (*M.*). Il capo d'anno in Cina e la seconda crisi bancaria: *Boezi* (*G.*). Per la dignita della scienza: *Bariera* (*G.*). Per la dignita della scienza: *Caronna* (*F.*).

La Riforma Sociale. June, 1911—Il regime legale e fiscale delle obbligazioni emesse dalle societa per azioni: *Geisser* (*Alberto*). Il monopolio delle assicurazioni e la questione della indennità alle imprese assicuratrici: *Einaudi* (*Luigi*).

MONTHLY LIST OF ADDITIONS TO THE LIBRARY.

During the month ended July 8, 1911, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they are acknowledged in a separate list contained in this *Journal.*

(a) Foreign Countries.

Austria—

Cracow. Statystyka Miasta Krakowa Opracowana Przez Biuro Statystyczne Miejskie, Zeszyt XI. Za Lata 1906 i 1907. 8vo. 1909. (The Stat. Bureau of Cracow.)

Bulgaria—

Census. Résultats généraux du recensement de la population au 31 Décembre, 1905. Livre 1. 4to. 1911. (The Director-General of Statistics.)

France—

Statistique générale de la France. Rapport sur les travaux de l'année 1910. 3 pp., 4to. 1911. (The Ministry of Labour.)

Labour. Enquête sur le travail à domicile dans l'industrie de la lingerie. Tome 4. 8vo. 1911. (*Id.*)

Germany—

Berlin.

Gross-Berlin. Statistische Monatsberichte . . . Jan.—Dez., 1910. In 8 parts, 4to. 1910. (The Municipal Statistical Bureau.)

Die Grundstücks-Aufnahme von Ende Oktober, 1905, sowie die Wohnungs- und die Bevölkerungs-Aufnahme vom 1 Dezember, 1905, in der Stadt Berlin und 29 benachbarten Gemeinden. Abteilung 2. Bevölkerungs-Aufnahme. 4to. 1911. (*Id.*)

Annalen für Soziale Politik und Gesetzgebung. Herausgegeben von Dr. H. Braun. Band i, Heft 1. 8vo. 1911. (Julius Springer, the Publisher.)

Hungary—

Agriculture. Production mondiale des blés en 1910. 2e edition. 43 pp., 8vo. 1911. (Another copy in German.) (Baron Albin de Than.)

Royal Hungarian Office of Workmen's Insurance. Report on the work of the Office in 1907 and 1908. (In Hungarian.) 8vo. 1910. (The Office.)

Netherlands—

Census. Resultats du 9e recensement de la population au 31 Décembre, 1909. 2e partie, 4to. 1911. (The Central Statistical Bureau.)

Russia—

Finland. Elections pour la Diète en 1910. La. 8vo. 1911. (The Central Statistical Bureau.)

Switzerland—

Births, &c., Mariages, Naissances et Décès en Suisse de 1891 à 1900. 2e partie. Les Naissances. 4to. 1911. (The Federal Statistical Bureau.)

United States—

New Hampshire. Miscellaneous Revolutionary Documents of New Hampshire, including the association test, the pension rolls, and other important papers. Vol. 30. State Papers Series. 8vo. 1910. (The State Library.)

Supplement to Annals of American Academy. May, 1911. The Living-Wage of Women Workers, a study of incomes and expenditures of four hundred and fifty women workers in Boston, by Louise Marion Bosworth. 90 pp., 8vo. 1911. (The Academy.)

International—

Institut International de Bibliographie. Publication No. 109. La Statistique Internationale des Imprimés. 139 pp., 8vo. 1911. (The Institute.)

(b) India and Colonies.

Leeward Islands—

Census, 1911, as compared with census, 1901, of Antigua, St. Kitts-Nevis, Dominica, Montserrat and Virgin Islands. 12 pp., fol. 1911. (The Acting Colonial Secretary.)

(c) United Kingdom and its several Divisions.

United Kingdom—

Alcoholic Beverages, 1909. (319.) 1911. (The Board of Trade.)

Canals. Royal Commission on Canals and Waterways. Vol. 12. Appendices to Final Report on Canals and Inland Navigations of Ireland. [Cd-5653.] 1911. (Purchased.)

Education. Report of Imperial Education Conference, 1911. [Cd-5666.] 8vo. 1911. (*Id.*)

Germany (Goods Imported.) (143.) 1911. (*Id.*)

Germany (Tariff-Treaties and Trade.) (144.) 1911. (*Id.*)

Insurance Legislation in Germany. [Cd-5679.] 1911. (*Id.*)

National Insurance Bill. (Part 2. Unemployment). Tables showing rules and expenditure of trade unions in respect of unemployed benefits, and also showing earnings in insured trades. [Cd-5703.] 1911. (The Labour Department Board of Trade.)

National Insurance Bill. Copy of Memorandum explanatory of Bill. (147.) 1911. (Purchased.)

National Insurance Bill. Copy of Memorandum on Sickness and Invalidity Insurance in Germany. [Cd-5678.] 1911. (*Id.*)

National Insurance Bill. (Part 2. Unemployment.) Return containing Report by Mr. Thomas G. Ackland. (162.) 1911. (*Id.*)

National Insurance Bill. (Part 2. Unemployment.) Return containing explanatory memorandum with regard to scheme for Insurance against Unemployment embodied in Part 2 of National Insurance Bill. (148.) 1911. (*Id.*)

Report of Departmental Committee on Railway Agreements and Amalgamations. [Cd-5631.] 1911. (*Id.*)

Religion. Royal Commission on Church of England and other religious bodies in Wales and Monmouth. Vol. 8. Indexes to minutes of evidence. [Cd-5439.] 1911. (The Commission.)

Trade Commissioners in Dominions. Reports to Board of Trade for period ending December 31, 1910. [Cd-5674.] 1911. (Purchased.)

England and Wales—

Census of England and Wales, 1911. Preliminary Report, with Tables of Population enumerated on April 3, 1911. [Cd-5705.] 1911. (The Registrar-General.)

Report on Guilds of Help in England. By G. R. Snowden. [Cd-5664.] 1911. (Purchased.)

London County Council. Education. Report on teaching of arithmetic in London elementary schools. 8vo. 1911. (The London County Council.)

Scotland—

Prisons. Report on Proceedings of 8th International Penitentiary Congress at Washington, October, 1910. By the Hon. W. G. Scott. [Cd-5640.] 8vo. 1911. (Purchased.)

(d) Authors, &c.

Arnauné (*Aug.*). Le Commerce extérieur et les Tarifs de Douane. iii + 534 pp., 8vo. Paris, 1911. (Felix Alcan.)

Bachi (*Prof. Riccardo*). L'Italia Economica nel 1910. Annuario della vita commerciale, industriale, agraria, bancaria, finanziaria, e della politica economica. Anno II. 222 pp., 8vo. Torino, 1910. (The Author.)

Boag (*Harold*). Compound interest, Annuities-certain, and Logarithmic calculations . . . 90 pp., 8vo. London, 1911. (*Id.*)

(d) Authors, &c.—*Contd.*

Canorai (*Tito*). I limiti della circolazione cartacea nella teoria, nella practica e nella legislazione. 96 pp., 8vo. Montegiorgio, 1911. (The Author, per Mr. Rozenraad.)

Deslandres (*Maurice*). L'Acheteur. Son rôle économique et social. Les ligues sociales d'acheteurs. vii + 507 pp., 8vo. Paris, 1911. (Felix Alcan.)

Fisher (*Irving*). The Equation of Exchange, 1896-1910. 12 pp., 8vo. 1911. (The Author.)

Fürer (*Rudolf Von*). Die Gestaltung des Arbeitsmarktes. (Studien über den Arbeitsmarkt. Band. 1.) 174 pp., 8vo. Wien. 1911. (Reichsverband des Allgem. Arbeitsvermittelungsanstalten in Oesterreich.)

Haggard (*F. T.*). Leaflet No. 100. Other investments *versus* consols. 3 pp., 8vo. 1911. (The Author.)

Irishman (*An*). The Financial Relations of Ireland with the Imperial Exchequer. [Anon.] 39 pp., 8vo., 1911. (The Author, c/o Messrs. Gill and Son, Dublin.)

Jèze (*Gaston*). Cours élémentaire de science des finances et de legislation financière française, 4^e^ edition. Fasc. 2, 8vo. Paris. 1910. (*Id.*)

Kettle (*T. M.*). Home Rule Finance. An experiment in justice. viii + 96 pp., 8vo. Dublin. 1911. (Messrs. Maunsel and Co., Ltd.)

Liszt (*Dr. Eduard Ritter von*). Die kriminelle Fruchtabtreibung. 2 vols. 8vo. Zurich, 1910-11. (Art. Institut Orell Füssli, Zurich.)

Richards (*H. Meredith*). Public Health and National Insurance. 71 pp., 8vo. London, 1911. (P. S. King and Son.)

Ross (*Agustin*). Chile: 1851-1910. Sixty years of Monetary and Financial Questions and of Banking Problems. 238 + iv pp., 8vo. Valparaiso, 1910. (The Author.)

Schooling (*John Holt*). The British Trade Book. A survey of home production and industries of United Kingdom, &c. Fourth issue. La. 8vo. London, 1911. (Mr. Murray.)

Scott (*William Robert*), M.A. Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720. Vol. 3. Water Supply, Postal, Street Lighting, Manufacturing, Banking, Finance and Insurance Companies, also Statements relating to the Crown Finances. xii + 563 pp., 8vo. Cambridge, 1911. (The Cambridge University Press.)

Sellar (*A. S.*). Layton's Simple Interest Tables at 1 per cent. on amounts ranging from 1*l.* to 100,000*l.* for intervals of 1 day up to 365 days, and for intervals of 1 month up to 12 months. 8vo. London, 1911. (The Compiler.)

Stevens (*Alfred*). The wide range income-tax calculator. . . 8 pp., 8vo. 1911. (Messrs. E. and F. N. Spon.)

Taylor (*F. Isabel*). Bibliography of Unemployment and the Unemployed. With preface by Sidney Webb, LL.B. xix + 71 pp., 8vo. 1909. (Purchased.)

Welton (*Thomas A.*). England's recent progress. An investigation of the statistics of migrations, mortality, &c., in the twenty years from 1881 to 1901 as indicating tendencies towards the growth or decay of particular communities. lxiv + 742 pp., 8vo. London, 1911. (The Author.)

Zahn (*F.*) (*Editor*). Die Statistik in Deutschland nach ihrem heutigen Stand. Georg von Mayr bei der Feier seines 70 Geburtstags am 12 Februar, 1911, als Ehrengabe dargebracht von A. Arnold . . . und F. Zahn (zugleich Herausgeber). Bands 1 and 2. 2 vols., 8vo. Munchen. 1911. (Dr. F. Zahn.)

Zahn (*Dr. Friedrich*). Deutschlands Wirtschaftliche Entwicklung unter besonderer Berucksichtigung der Volkszählung, 1905, sowie der Berufs- und Betriebszählung, 1907. 8vo. Berlin. 1911. (The Author).

The Encyclopædia Britannica. Eleventh edition. Vols. 1—29 inclusive. 29 vols., 4to. Cambridge. 1911. (Purchased.)

(e) Societies, &c., British.

Journal of Institute of Bankers. General Index to Volumes xvi—xxxi. Years 1895-1910. 8vo. London, 1911. (The Institute.)

Tariff Commission. The Problems of the Imperial Conference and the Policy of Preference. 47 pp., 4to. London, 1911. (The Commission.)

ANNUAL LIST OF ADDITIONS TO THE LIBRARY.

Since July 7, 1910, the Society has received the periodical publications enumerated below. The titles are arranged alphabetically by subjects (works of a general nature coming first) under the following heads:—(a) Foreign Countries; (b) India and Colonial Possessions; (c) United Kingdom and its Divisions; (d) Authors, &c.; (e) Societies, &c. (British); (f) Periodicals, &c. (British).

(a) Foreign Countries.

Argentine Republic—

Anuario de la Direccion General de Estadistica. Año 1909. Tomo 1. 8vo. 1911. (The Director-General of Statistics.)

Argentine Year-book, 1910. 8vo. 1911. (Messrs. W. H. Smith and Son.)

Agricultural Argentina. Agricultural Statistics for 1909-10. 8vo. 1910. (The Board of Agriculture and Fisheries.)

—— Statistique Agricole. Année agricole 1909-10. 8vo. 1910. (The Ministry of Agriculture.)

Banking. Banco Español del Rio de la Plata. Report and Balance Sheet for year ended June 30, 1910. Sheet. 1910. (The Bank.)

Cordoba (Province)—

Anuario de la Direccion General de Estadistica de la Provincia. Año 1909. 8vo. 1910. (The Director-General of Statistics.)

Agriculture. Campaña Agricola, 1909-10. 8vo. 1910. (*Id.*)

Austria-Hungary—

Railways. K.K. Eisenbahnministerium. Bericht über die Betriebsergebnisse der verstaatlichten Linien der priv. österr.-ungar. Staatseisenbahngesellschaft für 1909. 4to. 1911. (The Ministry of Railways.)

—— Bericht über die Betriebsergebnisse der Österr. Nordwestbahn und der Süd-Norddeutschen Verbindungsbahn für 1909. 4to. 1911. (*Id.*)

—— Bericht über die Ergebnisse der k.k. Staatseisenbahn-Verwaltung für 1909. 4to. 1910. (*Id.*)

—— Österreichische Eisenbahnstatistik für 1909. Teil 1. Hauptbahnen und Lokalbahnen. Teil 2. Kleinbahnen und diesen gleichzuhaltende Bahnen sowie Schleppbahnen. Fol. 1911. (*Id.*)

Trade. Statistik des auswärtigen Handels des Vertragszollgebiets der beiden Staaten der Österr.-Ungar. Monarchie im Jahre 1908. Band 4. 8vo. 1910. (The Ministry of Commerce.)

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HARRISON AND SONS, PRINTERS IN ORDINARY TO HIS MAJESTY, ST. MARTIN'S LANE, LONDON.

ROYAL STATISTICAL SOCIETY.

(Founded 1834. Incorporated 1887.)

9, ADELPHI TERRACE,
STRAND, LONDON, W.C.

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LONDON:
PRINTED FOR THE SOCIETY,
BY HARRISON AND SONS, 45, 46, and 47, ST. MARTIN'S LANE,
Printers in Ordinary to His Majesty.
1911.

ROYAL STATISTICAL SOCIETY.

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HIS MOST GRACIOUS MAJESTY THE KING.

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NOTICES TO FELLOWS.

July, 1911.

ANNUAL Subscriptions are due in advance, on the 1st of January in each year. A form for authorising a Banker or Agent to pay the subscription Annually will be forwarded on application to the Assistant Secretary. When convenient, this mode of payment is recommended. Drafts should be made payable to the order of "The Royal Statistical Society," and crossed "*Drummond and Co.*"

IN order to be included in the Ballot at any particular Ordinary Meeting, the nomination papers of candidates for Fellowship should be lodged at the Office of the Society at least six days before the date of such Meeting. Nomination papers may be obtained on application to the ASSISTANT SECRETARY.

FELLOWS wishing to receive special and separate notices of papers to be read before the Society at the Ordinary Meetings should communicate with the ASSISTANT SECRETARY.

THE Ordinary Meetings of the Society are held at 5 p.m., at **The Rooms of the Royal Society of Arts, John Street, Adelphi, W.C.,** unless otherwise announced.

Particulars as to papers to be read, and the time and place of meeting, will be found advertised in "The Times" and in other London daily papers on the Saturday preceding the date of each meeting. The attention of Fellows is particularly directed to these announcements.

EACH volume of the *Journal* (excepting Vol. LXXIII) is now issued in eight parts. Copies of the current issues will be delivered carriage free as heretofore to all Fellows of the Society. The price of each part will be 2*s.* 6*d.* to the general public, and the subscription, including postage, one guinea per annum. Addressees who fail to receive the *Journal* at the proper time are requested to communicate with the ASSISTANT SECRETARY without delay.

THE Library and the Reading Room are open daily during the Session for the use of Fellows from 10 a.m. to 7 p.m., except on Saturdays, when they are closed at 2 p.m., and on the dates of Ordinary Meetings, when they are closed at 4 p.m. During the months of July, August, and September, the Library and Reading Room will be open as follows:—Monday to Friday, 10 a.m. to 5 p.m.; Saturday, 10 a.m. to 2 p.m. (public holidays excepted).

It is requested that any change of address may be notified promptly to the ASSISTANT SECRETARY.

OUTLINE OF THE OBJECTS OF THE SOCIETY.

The Royal Statistical Society was founded on the 15th of March, 1834, in pursuance of a recommendation of the British Association for the Advancement of Science, its objects being the careful collection, arrangement, discussion and publication of facts bearing on and illustrating the complex relations of modern society in its social, economical and political aspects, especially facts which can be stated numerically and arranged in tables; and also, the formation of a Statistical Library as rapidly as its funds would permit.

From its inception the Society has steadily progressed. It now possesses a valuable Library of about 50,000 volumes, and reading rooms. Monthly meetings, which are well attended and cultivate among its Fellows an active spirit of investigation, are held from November to June. The Papers read at these meetings, with an abstract of the discussions thereon, are published in the *Journal*, which now consists of seventy-four annual volumes, and forms of itself a valuable library of reference.

The Society has originated and statistically conducted many special inquiries on subjects of economic or social interest, of which the results have been published in the *Journal*, or issued separately.

To enable the Society to extend its sphere of useful activity and accomplish in a yet greater degree the various ends indicated, an increase in its numbers and revenue is desirable. With the desired increase in the number of Fellows, the Society will be enabled to publish standard works on Economic Science and Statistics, especially such as are out of print or scarce, and also greatly extend its collection of foreign works. Such a well-arranged Library for reference as would result does not at present exist in England, and is obviously a great *desideratum.*

The Society is cosmopolitan, and consists of Fellows and Honorary Fellows, together forming at the present time a body of about nine hundred Members.

The annual subscription to the Society is Two Guineas, and at present there is no entrance fee. Fellows may, on joining the Society or afterwards, compound for all future annual subscriptions by a payment of Twenty Guineas, and after the payment of twenty-five annual subscriptions by a payment of Ten Guineas.

The Fellows of the Society receive gratuitously a copy of each part of the *Journal* as published, and have the privilege of purchasing back numbers at a reduced rate. The Library (reference and circulating) and the Reading Rooms are open daily for the convenience of Members.

Nomination Forms, with any further information, will be furnished, on application to the *Assistant Secretary, Royal Statistical Society,* 9, *Adelphi Terrace, Strand, W.C., London.*

LIST OF PUBLICATIONS.

Note.—Sets or separate numbers of the *Journal*, or of the other publications of the Society (if not out of print), can be obtained at the Offices of the Society, or through any bookseller. Fellows may purchase these publications at a reduced rate.

	Price.
Journal (published quarterly)—	
Vols. 1—72. 8vo. 1838-1909	5*s*. each part.*
Journal (published monthly during the session). New Series—	
Vol. 73. 1910 (complete in 7 parts)	2*s*. 6*d*. each part.
Vol. 74. 1910-11 (complete in 8 parts)	2*s*. 6*d*. each part.
General Analytical Index to Vols. 1—71 of the Journal (1838-1908). In 5 parts. 8vo.—	
(i) Vols. 1—15 (1838-52)	7*s*. 6*d*.
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(iv) Vols. 36—50 (1873-87)	3*s*. 6*d*.
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Subject-Index to the Journal, Vols. 28—57, 1865-94	1*s*. 6*d*.
Reports of the Committee appointed 20th November, 1900, to inquire into the statistics available as a basis for estimating the production and consumption of meat and milk in United Kingdom; with observations by Mr. R. H. Rew. 8vo. 1904	1*s*.
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573 pp. Cloth, super royal 8vo. 1884	10*s*.
Index to the Catalogue of 1884—	
372 pp. Cloth, super royal 8vo. 1886	10*s*.
Catalogue of the Library—	
276 pp. Cloth, 8vo. 1908	10*s*. 6*d*.
Jubilee Volume—	
xv + 372 pp. Cloth, 8vo. 1885	10*s*. 6*d*.

List of Fellows, containing the Rules and Bye-Laws of the Society, and corrected annually to 31st July, is issued gratuitously.

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* Before 1870 the price varied.

LIST
OF THE
Society's Guy Medallists,

With the Date of the Awards.

Medals in GOLD *have been awarded as follows—*

1892. The Rt. Hon. CHARLES BOOTH, F.R.S.
1894. Sir ROBERT GIFFEN, F.R.S.
1900. Sir J. ATHELSTANE BAINES, C.S.I.
1907. Prof. F. Y. EDGEWORTH, M.A., F.B.A.
1908. Major P. G. CRAIGIE, C.B.
1911. Mr. G. UDNY YULE.

Medals in SILVER *have been awarded as follows—*

NAME.	TITLE OF PAPER.
1893. Sir JOHN GLOVER, J.P.	**Tonnage Statistics of the Decade,* 1880–1890.
1894. Mr. A. SAUERBECK.	*Prices of Commodities during the last Seven Years.*
1895. Mr. A. L. BOWLEY, M.A.	*Changes in Average Wages (Nominal and Real) in the United Kingdom between* 1860 *and* 1891.
1897. Mr. FRED. J. ATKINSON.	*Silver Prices in India.*
1899. Professor C.S. LOCH, D.C.L.	*Poor Relief in Scotland: its Statistics and Development,* 1791–1891.
1900. Sir R. F. CRAWFORD, K.C.M.G.	*Notes on the Food Supply of the United Kingdom, Belgium, France, and Germany.*
1901. Mr. T. A. WELTON, F.C.A.	*Distribution of Population in England and Wales in the Period of Ninety Years from* 1801 *to* 1891.
1902. Mr. R. H. HOOKER, M.A.	*Suspension of the Berlin Produce Exchange, and its effect on Corn Prices.*
1903. M. YVES GUYOT.	*The Sugar Industry on the Continent.*
1904. Mr. D. A. THOMAS, M.P.	*The Growth and Direction of our Foreign Trade in Coal during the last Half Century.*
1905. Mr. R. H. REW.	*Reports of the Committee on Meat and Milk Production.*
1906. Dr. W. N. SHAW, F.R.S.	*Seasons in the British Isles from* 1878.
1907. Mr. N. A. HUMPHREYS, I.S.O.	*The Alleged Increase of Insanity.*
1909. Sir E. W. BRABROOK, C.B.	*Social Insurances, and his earlier Papers on the Progress of Friendly Societies.*
1910. Mr. G. H. WOOD.	*His Papers on Statistics of Wages in the United Kingdom during the Nineteenth Century.*

---

* This paper was one of a series which now contains five decennial reviews.

LIST

OF THE

Society's Howard Medallists.

NAME.		SUBJECT OF COMPETITION.
1875.	Mr. Edward Smith.	*Influence of improved Dwellings of the Poor in Rural Districts of England.*
1876.	Dr. J. C. Steele.	*Past and Present Mortality of Hospitals in the United Kingdom.*
1878.	Dr. John Martin and Captain H. Hildyard (*extra Prize*).	*Effects of Health and Disease on Military and Naval Operations.*
1879.	Miss B. Jourdan.	*Improvements in Education of Children in Eighteenth and Nineteenth Centuries.*
1880.	Mr. H. P. Potter.	*The Oriental Plague, and Howard's Labours on the subject.*
1881.	Dr. F. Pollard.	*On the Jail Fever, from the earliest Black Assize to the latest Outbreak.*
1882.	Mr. D. Manson Fraser.	*State of English Prisons in the Eighteenth Century, and its relation to Small-Pox.*
1883.	Dr. R. D. R. Sweeting.	*John Howard on Health of Inmates of Prisons, Workhouses, and other Public Institutions.*
1884.	Dr. Clement Dukes.	*Howard's Opinions on the Preservation of Health as affected by Personal Habits.*
1893.	Dr. Hugh R. Jones.	*Perils and Protection of Infant Life.*
1895.	Mr. John Watson.	*Reformatory and Industrial Schools.*
1897.	Dr. James Kerr.	*School Hygiene.*
1899.	Miss Rosa M. Barrett.	*Sentences on, and Punishments of, Juvenile Offenders in Europe and the United States.*
1900.	Dr. J. F. J. Sykes.	*Housing of the Working Classes in London and other large Towns.*
1904.	Mr. Leonard Ward.	*Effects of State Regulation of Dangerous Trades on Health of Workers.*
1908.	Mr. Percy E. Braun, B.Sc.	*The Cost, Conditions and Results of Hospital Relief in London.*

Notice.—The subject appointed for the next "Howard Medal" Essay Competition (Session 1911-12) is: **"The Results of Detention in Labour Colonies."** The competition is open to the public, and a statement of the conditions may be obtained from the Assistant Secretary.

ROYAL STATISTICAL SOCIETY.

Each Fellow is entitled to receive one copy of each part of the Society's "JOURNAL," as published, forming in the course of the year a volume of about 800 pages. Fellows may obtain additional copies, and copies of back issues (with certain exceptions) at three-fifths of the publishing price.

The Society's LIBRARY comprises about 50,000 volumes, including the most important statistical publications, serial and other, of British or foreign Governments, as well as a large collection of general statistical and economic works. A copy of the Catalogue, published in 1908, is obtainable by each Fellow free of cost. The Reading Rooms are open daily during the Session for the use of Fellows from 10 a.m. to 7 p.m., except on Saturdays, when they are closed at 2 p.m., and on the dates of Ordinary Meetings, when they are closed at 4 p.m. During the months of July, August, and September the Library and Reading Room will be open as follows:—Monday to Friday, 10 a.m. to 5 p.m., Saturday, 10 a.m. to 2 p.m. (Public holidays excepted). In addition to the facilities afforded for reading in the Library Fellows may, under the regulations, borrow books up to the number of ten at a time.

Fellows wishing to receive special and separate notices of each paper to be read before the Society at the Ordinary Meetings should communicate with the Assistant Secretary.

FELLOWSHIP is attained by election.

CANDIDATES must be proposed and seconded by Fellows of the Society, who, either from personal or general knowledge, vouch for the Candidate's qualification and eligibility. On the nomination of the Council, Candidates may be elected as Fellows by a Ballot taken at any Ordinary Meeting of the Society.

There is at present no entrance fee and the SUBSCRIPTION is TWO GUINEAS per annum.

In lieu of the annual subscription, a COMPOSITION of twenty guineas is accepted, or after the payment of twenty-five annual subscriptions, the sum of ten guineas.

Further particulars, Lists of Fellows, Copies of the Rules, &c., may be obtained on application to THE ASSISTANT SECRETARY, ROYAL STATISTICAL SOCIETY, 9, Adelphi Terrace, Strand, London, W.C.

ROYAL STATISTICAL SOCIETY.

Founded 15*th March*, 1834, *Incorporated* 31*st January*, 1887.

LIST OF THE

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Patrons.

	Period.
His Royal Highness The Prince Consort, K.G.	1840-61
His Most Gracious Majesty King Edward VII	1901-10
His Most Gracious Majesty King George V.	1910

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The Rt. Hon. The Lord Overstone	1851-53
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LIST OF FELLOWS.

The names of Present Members of Council are printed in SMALL CAPITALS.
Those marked *c* have Served or are Serving on the Council.
,, *d* have made Presentations to the Library.
,, *p* have contributed Papers to the Society.
,, * have compounded for their Annual Subscriptions.

Year of Election.		
1904	*d*	*à Ababrelton, Robert, F.R.G.S., *Post Box 322, Pietermaritzburg, Natal.*
1907		*à Ababrelton, Robert R. de R., F.R.E.S., *Registry and Record Dept., India Office, S.W.*
1906		Abrahams, E. Goldsmid, *Albany Courtyard, Piccadilly, W.*
1888		Ackland, Thomas G., F.I.A. (5 *and* 6, *Clement's Inn*), *The Thatched House, Muswell-hill, Highgate, N.*
1888	*c d p*	Acland, The Right Hon. A. H. Dyke, M.A., *Dunkery House, Felixstowe.*
1892	*c d p*	ACWORTH, WILLIAM M., M.A. (*Vice-President*), *The Albany, Piccadilly, W.*
1905	*d p*	Adams, W. G. S., M.A., *Dept. of Agri. and Tech. Instruction, Dublin.*
1902	*d*	Adeane, Charles R. W., *Babraham Hall, near Cambridge.*
1884		Agius, Edward T., 3, *Belsize-grove, N.W.*
1910		Akers, Alfred, 31, *Walbrook, E.C.*
1908		Alexander, Charles S., *Taipeng, Perak, Federated Malay States.*
1896		Allen, George B., *Free Chase, Warminglid, Hayward's Heath.*

Year of Election.		
1908		Allen, H. C., *Buenos Ayres Gt. Southern Rly. Co., Ltd., River Plate House, Finsbury Circus, E.C.*
1898		Allen, William H., *Bromham House, Bromham, near Bedford.*
1880		*Allerton, The Right Hon. Lord, *Chapelallerton, Leeds.*
1893	*d*	Anderson, Herbert W., C.E., *S.W. Laboratory*, 43, *St. James's-rd., Kingston.*
1889		Anderson, John A., *Faversham, Kent.*
1907	*d*	Andersson, Thor E. E., Ph.D., *Ynglingagatan* 17, *Stockholm.*
1886		Andras, Henry W., F.I.A., 50, *Regent-street, W.*
1871		Angus, R. B., *Montreal, Canada.*
1897		Anning, Edward H., F.R.G.S., 78, *Cheapside, E.C.*
1906		Archer, Walter E., C.B., 17, *Sloane-court, S.W.*
1872		*Archibald, William F. A., M.A., 114, *Royal Courts of Justice, Strand, W.C.*
1892	*d*	Argyle, Jesse, 86, *Aberdeen-road, Highbury, N.*
1906		Arkell, George E., 107, *Ivanhoe-road, Denmark-park, S.E.*
1888		Asch, William, 62½, *Old Broad-street, E.C.*
1908		Ashley, Percy W. L., *Board of Trade, Gwydyr House, Whitehall, S.W.*
1909	*c d*	ASKWITH, GEORGE R., K.C., C.B., *Board of Trade, Gwydyr House, Whitehall, S.W.*
1909		Astor, Waldorf, M.P., *Astor Estate Office, Victoria Embankment, W.C.*
1888	*d*	Atkinson, Charles, 56, *Palewell-park, East Sheen.*
1893	*d p*	Atkinson, Frederic J., *c/o Messrs. Henry S. King & Co.*, 9, *Pall Mall, S.W.*
1865	*c d p*	AVEBURY, RIGHT HON. LORD, F.R.S. (*Honorary Vice-President*), *High Elms, Farnbro', R.S.O. Kent.*
1904		Avery, John, F.C.A., 23, *St. Swithin's-lane, E.C.*
1893		*Aves, Ernest, M.A., 12, *Thurlow-road, Hampstead, N.W.*

Year of Election.		
1872	*c d*	*Babbage, Major-General Henry P., *Mayfield, Lansdown, Cheltenham.*
1892		Bacon, George W., F.R.G.S., 127, *Strand, W.C.*
1909		*Bagnall, Bernard T. S., A.C.A., *Myrtleville, Tavistock-road, Plymouth.*
1855	*c d*	Bailey, Arthur H., F.I.A., 26, *Mount Ephraim-road, Streatham, S.W.*
1908		Bailey, Frederick, "*Lesma,*" *Queen's-road, Springfield, Chelmsford.*
1907		Bailey, Walter, *The Gobbins, Burton-road, Derby.*
1881	*c d p*	BAINES, SIR J. ATHELSTANE, C.S.I. (*Hon. Vice-President*), *Kidlington, Oxon.*
1906	*p*	Baldwin-Wiseman, William R., M.Sc., A.M. Inst. C.E., 24, *Winchester-road, Southampton.*
1878		Balfour, The Right Hon. Arthur J., M.P., F.R.S., 4, *Carlton-gardens, S.W.*
1886		Balfour, The Right Hon. Gerald W., *Fishers-hill, Woking.*
1907		Balleine, Arthur E., 4, *Whitehall-place, S.W.*
1903	*d*	Bamber, Lieut.-Col. Charles J., D.P.H., *Sanitary Comm. to Gov. of the Punjab, Lahore.*
1911		*Barker, Geoffrey Palgrave, B.A., *Henstead Hall, Wrentham, Suffolk.*
1910		Barker, J. Ellis, *Constitutional Club, Northumberland-avenue, W.C.*
1887		Barnes, Joseph H., F.I.A., 19, *Lombard-street, E.C.*
1887		*Barrett, Thomas S., F.Z.S., M.A.I., &c., *Rose Cottage, Millfield-road, Widnes.*
1888		*Bartlett, Frederick W., *Paymaster General's Office, Whitehall, S.W.*
1907	*d*	Bassett, Herbert H., "*Darentlea,*" *Eynsford, Kent.*
1889	*d*	Bastable, Professor C. F., M.A., LL.D., 52, *Brighton-road, Rathgar, Dublin.*
1877	*c d p*	BATEMAN, SIR ALFRED E., K.C.M.G. (*Hon. Vice-President*), *Woodhouse, Wimbledon-park, S.W.*
1877		Bayfield, Arthur, 95, *Colmore-row, Birmingham.*
1873		*Baynes, Alfred H., F.R.G.S., J.P., *Fitzwalters, Northwood, Middlesex*
1905		Beaven, Edwin S., *Eastway, Warminster.*
1882	*d*	*Beazeley, Michael W., M.A., *Worting, Basingstoke.*

Year of Election.		
1882	c d	*Beeton, Henry R., 9, *Maresfield-gardens, Hampstead, N.W.*
1899	d	Beeton, Mayson M., B.A.,
1886	d	Begg, Ferdinand F., *Bartholomew House, E.C.*
1884	d	Bell, James T., 330, *Mansfield-road, Nottingham.*
1901		Bellingham, Archer, *Walcot, Burghley-road, Wimbledon.*
1908	d	*Bellom, Professor Maurice. 6, *rue Daubigny, Paris, XVII.*
1910		Bennett, Samuel, *Registrar of Friendly Societies, Perth, Western Australia.*
1884		*Bentley, Richard, F.R.G.S., *Upton, Slough, Bucks.*
1910		Beresford, Frank. 22, *Barnsbury-park, N.*
1907		Bernard, Major Francis T. H., *Chearsley Hall, Aylesbury.*
1890		Berry, Arthur, M.A., *King's College, Cambridge.*
1891		Berry, Oscar, C.C., F.C.A., *Monument House, Monument-square, E.C.*
1909		Beveridge, William H., *Board of Trade, Gwydyr House, Whitehall, S.W.*
1869	p	*Beverley, The Hon. Mr. Justice Henry, *Nascot Lodge, Watford.*
1888		Billinghurst, Henry F., 7, *Oakcroft-road, Blackheath, S.E.*
1899	c	Birchenough, Henry, C.M.G., M.A., 79, *Eccleston-square, S.W.*
1901		Bird, Harry, C.C., *Connaught Lodge, Chingford, Essex.*
1881	d	Bishop, George, 113, *Powis-street, Woolwich.*
1902		Bisset-Smith, George T., 55, *Carlton-place, Aberdeen.*
1898		Blount, Edward T. J., F.F.A., A.I.A., *Standard Life Insurance Co., 3, George-street, Edinburgh.*
1911		Blue, John, *Edmonton, Alberta, Canada.*
1898	c d	*Blyth, Rt. Hon. Lord, *Stansted, Essex ; and* 33, *Portland-place, W.*
1910		Boag, Harold, A.I.A., 33, *Albert Drive, Low Fell, Gateshead.*
1911		Bobart, H. H., 22, *Basinghall-street, E.C.*
1907		Boddy, Henry M., *Manufacturers Life Insurance Co Vancouver Agency, British Columbia.*

Year of Election.		
1881		Bolitho, Thomas R., *Trengwainton, Hea Moor, R.S.O., Cornwall.*
1890		Bolton, Edward, J.P., *Ravensthorpe, Hessle, E. York.*
1885	*c d*	*Bonar, James, M.A., LL.D., *The Mint, Ottawa, Canada.*
1887	*c*	BOND, EDWARD, M.A. 43, *Thurloe-square, S.W.*
1905		*Bonn, Max J., 43, *Park-lane, W.*
1885	*c d p*	BOOTH, RT. HON. CHARLES, D.C.L., D.Sc., F.R.S. (*Hon. Vice-President*), 11, *Adelphi-terrace, Strand, W.C.; Stanfield House, High-street, Hampstead, N.W., c/o Jesse Argyle.*
1909		Bowers, F. Gatus, 12, *Elgin-road, Seven Kings, Essex.*
1894	*c d p*	Bowley, Arthur L., M.A., *Northcourt-avenue, Reading.*
1909		Boyd-Carpenter, Archibald, 22, *Park-avenue. Harrogate.*
1894	*c d p*	Brabrook, Sir Edward W., C.B., Dir. S.A. 178, *Bedford-hill, Balham, S.W.*
1883		Braby, Frederick, F.C.S., F.G.S., *Bushey Lodge, Teddington.*
1873	*c d p*	BRASSEY, THE RIGHT HON. LORD, G.C.B. (*Honorary Vice-President*), 24, *Park-lane, W.*
1903	*d p*	Brassey, The Hon. Thomas A., *Park-gate, Battle.*
1907	*p*	Braun, Percy E., B.Sc., *London County Council, Spring Gardens, S.W.*
1864		*Braye, The Right Hon. Lord, *Stanford Hall, Market Harborough.*
1910		Breul, Ernest, D.T.E., 223, *Brunswick-street, Oxford-rd., Manchester.*
1902	*d*	Broadbent, Albert. 257, *Deans Gate, Manchester.*
1906		Brook, Herbert E. J., *Brimsmore, Selwyn-road, Malden, Surrey.*
1874		Broom, Andrew, A.C.A., *Eaglehurst, Staines, Middlesex.*
1895	*d*	Broomhall, George J. S., 17, *Goree Piazzas, Liverpool.*
1878		Brown, Sir Alexander H., Bart., 12, *Grosvenor-gardens, S.W.*
1901		Brown, B. Hal., *London & Lancs. Life Insurance Co., Montreal, Canada.*
1896		*Brown, Daniel M., *P.O. Box* 187, *Carra Linn, Port Elizabeth.*
1903	*d*	Brown, S. Stanley, *Hamilton House, Victoria Embankment, E.C.*

Year of Election		
1875	*p*	Browne, Thomas G. C., F.I.A., 11, *Lombard-street, E.C.*
1908		Brownlee, John. M.D., D.Sc., *Ruchill Fever Hospital, Glasgow.*
1910		Bruce, Alexander Bannerman, 10, *Luxemburg-gardens, W.*
1886		*Brunner, The Rt. Hon. Sir John T., Bart., 9, *Ennismore-gardens, S.W.*
1909		*Buchanan, Dr. James, M.A., D.Sc., F.F.A., F.I.A., 9, *St. Andrew-square, Edinburgh.*
1880	*c d p*	*Burdett, Sir Henry C., K.C.B., *The Lodge, Porchester-square, W.*
1884	*d*	Burdett-Coutts, William, M.P., 1, *Stratton-street, Piccadilly, W.*
1902		Burgess, James H., F.S.A.A., *Bergen House, St. Catherine's, Lincoln.*
1897		Burke, David, A.I.A., *Royal Victoria Life Insurance Co., Montreal.*
1895		Burrup, J. Arthur E., *Custom House, Calcutta, India.*
1880		Burt, Frederick, F.R.G.S., *Pinewood, Stoke Poges, R.S.O. nr. Slough, Bucks.*
1901		Burt, George S., 21, *Glasbury-road, West Kensington.*
1906		Bush, Joseph H., " *Varaville,*" *Cranbrook-road, Ilford.*
1910		Butler, Harold William, "*Tregonhay,*" *Burntwood-lane, Wandsworth Com.*
1911		Butler, Thomas, *Department of Agriculture and Technical Instruction for Ireland, Upper Merton-street, Dublin, Ireland.*
1892		Byworth, Charles J., F.S.A.A., *The Limes, Sutton Common-rd., Benhilton, Surrey.*
1902	*d*	Caillard, Sir Vincent H. P., 42, *Half Moon-street, W.*
1897		Cairnes, Frederick E., *Killester House, Raheny, Co. Dublin.*
1903		Caldwell, William, 162. *Bath-street, Glasgow.*
1911		Callie, J. W. S., 18. *Hackin's Hey, Liverpool.*
1911		Campbell, A. R., *Canada House, Norfolk-street, Strand, W.C.*

Year of Election.		
1911		Campbell, Charles W., C.M.G., *British Legation, Pekin, China.*
1905	*d*	Campbell, Richardson, 37, *Lansdowne-road, Crumpsall, Manchester.*
1879		Campbell-Colquhoun, Rev. John E., *Chartwell, Westerham, Kent.*
1889	*d p*	Cannan, Prof. Edwin, M.A., LL.D., 11, *Chadlington-road, Oxford.*
1891	*d*	Cannon, Henry W., *Chase National Bank,* 83, *Cedar-street, New York, U.S.A.*
1900	*d*	Canovai, Commendatore Tito, *Bank of Italy, Rome.*
1904		Carrington, John B., F.S.A.A., 20, *Blomfield-road, Maida Vale, W.*
1910		Carson, H. C., 193, *Spadina-road, Toronto, Canada.*
1890		*Carter, Eric M., A.I.A., F.C.A., 33, *Waterloo-street, Birmingham.*
1883	*d*	*Carter, Joseph R., *Courtfield, Ross-road, Wallington, Surrey.*
1911		Cassel, Felix, K.C., M.P., 25, *Bryanston-square, W.*
1907		*Chabot, Marius T., 35, *Westersingel, Rotterdam, Holland.*
1884	*d*	*Chailley-Bert, Joseph, *Union Coloniale Française,* 44, *Chaussée d'Antin, Paris.*
1880		*Chamberlain, The Right Hon. Joseph, M.P., F.R.S., *Highbury, Moor Green, Birmingham.*
1901	*d p*	Chance, Sir William, Bart., J.P., *Orchards, near Godalming.*
1903		Channing, Sir Francis A., Bart., 40, *Eaton-place, S.W.*
1886	*d p*	*Chapman, Samuel, 225—228, *Gresham House, Old Broad-st., E.C.*
1903	*c d p*	CHAPMAN, PROFESSOR SYDNEY J., M.A., *Owens College, Manchester.*
1901	*d*	Chapman, Walter W., 4, *Mowbray House, Norfolk-street, Strand, W.C.*
1904		Charles, Thomas E., 52, *Sandrock-road, Lewisham, S.E.*
1888		*Charnwood, The Right Hon. Lord, 108, *Eaton-square, S.W.*
1892		*Chatham, James, F.I.A., F.F.A., 7, *Belgrave-crescent, Edinburgh.*
1903	*d*	Chiozza-Money, Leo G., M.P., "*Tyhurst,*" *Chaldon-by-Caterham, Surrey.*
1886	*c d p*	*Chisholm, George G., M.A., B.Sc., F.R.G.S., 12, *Hallhead-rd., Craigmillar Pk., Edinburgh.*
1906		Choles, Herbert J., *Dept. of Agriculture; Pietermaritzburg, Natal.*

Year of Election.		
1910		Christian, Edward Alan, *24, Park-road South, Birkenhead.*
1904		Clark, Prof. Arch. Brown, *Department of Political Economy, University of Manitoba, Winnipeg, Man., Canada.*
1909		Clark, Albert Hawkins, A.M.I.C.E., 58, *Elmbourne-road, Tooting Common, S.W.*
1909	*d*	Clark, Dr. Charles C., *Bureau of Statistics, Dept. of Agriculture, Washington, D.C., U.S.A.*
1901	*c*	Clark, William H., C.M.G., *Government House, Calcutta, India.*
1882	*c d*	*CLARKE, SIR ERNEST, 31, *Tavistock-square, W.C.*
1877	*c d*	*Clarke, Henry, L.R.C.P., *Courns Wood, Hughenden, High Wycombe.*
1890		Clarke, Henry, J.P., *Cannon Hall, Hampstead, N.W.*
1908		Clarke, John J., 48, *Laurel-road, Fairfield, Liverpool.*
1899		Claughton, Gilbert H., *The Priory, Dudley.*
1908		Clay, Sir Arthur T. F., Bart., 19, *Hyde Park Gate, S.W.*
1907		Cleaver, Edgar J., F.A.A., 43, *Amberley House, Norfolk-street, Strand, W.C.*
1907		Clements, Lieut.-Col. H. C., V.D., *Cheriton, Lismore-road, South Croydon.*
1911		Coats, Robert Hamilton, B.A., *Department of Labour, Ottawa, Canada.*
1910		Cocker, Edwin, 7, *Brogden-grove, Brooklands, Manchester.*
1893	*c d p*	Coghlan, Timothy A., I.S.O., 123 *and* 125, *Cannon-street, E.C.*
1905		*Cohen, C. Waley, M.A., 11, *Hyde Park-terrace, W.*
1887	*c d*	Cohen, Nathaniel L., 11, *Hyde Park-terrace, W.*
1859		Coles, John, F.I.A., 4, *Kensington Park-gardens, W.*
1905		Coles, Richard J., F.C.I.S., *Addenbrooke's Hospital, Cambridge.*
1892	*d p*	*Collet, Miss Clara E., M.A., *Board of Trade, Gwydyr House, Whitehall, S.W.*
1895		Collins, Howard J., *The General Hospital, Birmingham.*
1906		Collins, Percy, 81–83, *Cheapside, E.C.*
1882		*Collum, Rev. Hugh R., M.R.I.A., F.R.C.I., 35, *Oakley-street, Chelsea, S.W.*

Year of Election.		
1911		Cook, Arthur James, A.I.A., M.J.I., 6, *Dorset-square, Regent's Park, N.W.*
1903	*d*	Cook-Watson, Ralph, *Standard Chambers, Neville-st., Newcastle-on-T.*
1887		Cooke-Taylor, R. Whately, *High Trees, Chepstow.*
1888		*Cooke-Taylor, Theodore, J.P., *Sunny Bank, Batley, Yorkshire.*
1891	*d*	Cooper, Joseph, 32, *Kildare-street, Farnworth, near Bolton.*
1906		Cornish, George F., *New House, Knowle St. Giles, Chard, Somerset.*
1889		Cornwallis, Fiennes S. W., *Linton-park, Maidstone, Kent.*
1911		*Cory, Sir Clifford John, Bart., M.P., *Llantarnam Abbey, Monmouthshire.*
1899	*d*	Court, Stephen E., 11, *Courtfield-gardens, S.W.*
1862	*c d p*	COURTNEY, RIGHT HON. LORD (*Hon. Vice-President*), 15, *Cheyne Walk, Chelsea, S.W.*
1902		*Coxon, William, 15, *Elsworthy-terrace, N.W.*
1907		Coyagi, Professor Jehangi,
1871	*d*	Cozens-Smith, Edward, 16, *Kensington-square, W.*
1874	*c d p*	CRAIGIE, MAJOR P. G., C.B. (*Hon. Vice-President*), *Bronté House, Lympstone, Devon.*
1910		Crammond, Edgar, 33, *Gorsehill-road, New Brighton, Cheshire.*
1902		Craven, Edward J. E., *Secretary's Office, H.M. Customs and Excise, Ocean House, E.C.*
1890	*c d p*	Crawford, Sir Richard F., K.C.M.G., *c/o F. R. Sneath, Esq.*, 1, *New-court, Lincoln's Inn, W.C.*
1891		*Crawley, Charles E., *Lanhydrock Villa, Truro, Cornwall.*
1878		Crewdson, Ernest, *Grinstead, Green-lane, Buxton, Derbyshire.*
1892		Cripps, Sir C. Alfred, K.C.V.O., M.P. 1, *Essex-court, Temple, E.C.*
1890		Croal, David O., *Financial News*, 111, *Queen Victoria-street, E.C.*
1907		Cromer, The Rt. Hon. The Earl of, O.M., G.C.B., G.C.M.G., K.C.S.I., 36, *Wimpole-street, W.*
1904		Crotch, W. Walter, 79, *Earlham-road, Norwich.*
1911		Crowe, Edward T. F., C.M.G., *H.B.M. Consulate-General, Yokohama, Japan.*
1911		Cunningham, George H., *Valley-cottage, New York, U.S.A.*

Year of Election.		
1883	*c d*	Cunningham, The Venble. Archdeacon, D.D 2, *St. Paul's-road, Cambridge.*
1879	*d*	Curtis, Robert L., F.S.I., J.P., 11—12, *Finsbury-square, E.C.*
1910		Dale, Augustus Charles, I.S.O., *Braemar Cottage, Maitland, Cape Town.*
1900		Dale, Charles E., F.S.A.A., *Old Calabar, West Africa.*
1910		Dalton, Hugh, 4, *Brick-court, Temple, E.C.*
1888		Dangerfield, Athelstan, F.C.A., 56, *Cannon-street, E.C.*
1898	*d*	*Danson, Francis C., *Tower Buildings, Water-street, Liverpool.*
1901	*d*	Danvers, Ernest, F.R.G.S., 475, *B. Mitre, Buenos Ayres.*
1909		Darton, Oscar, F.C.A., 10, *Old Jewry Chambers, London, E.C.*
1897	*d p*	*Darwin, Major Leonard, R.E., F.R.G.S., 12, *Egerton-place, S.W.*
1901	*d*	Davar, Sohrab R., M.S.A., 53, *Esplanade-road, Fort, Bombay.*
1901		Davies, Dixon H., *Great Central Ry., Marylebone Station, N.W.*
1869		Davies, James M., 168, *St. Vincent-street, Glasgow.*
1888		Dawson, G. J. Crosbie, M.Inst.C.E., F.G.S., *May-place, Newcastle, Staffs.*
1899		Dawson, Miles M., F.A.S., F.I.A., 76, *William-street, New York, U.S.A.*
1903	*d*	Dawson, Sidney S., F.C.A., F.C.I.S. 51, *North John-street, Liverpool.*
1880		Debenham, Frank, 1, *Fitzjohn's-avenue, Hampstead, N.W.*
1885	*d*	De Broë, Emile C. De Bichin, *Walden Lodge, Carlisle-road, Eastbourne.*
1900	*d*	De la Plaza, Victorino, LL.D. (*Buenos Ayres Ry. Co.*), *Poste Restante, Buenos Ayres.*
1907		Denman, Hon. Richard D., 9, *Swan-walk, Chelsea, S.W.*
1891		Denne, William, *Lancaster Villa, Beltinge, Herne Bay.*

Year of Election.		
1873		Dent, Edward, 2, *Carlos-place, Grosvenor-square, W.*
1887		Dent, George M., 20, *Park-avenue, Southport.*
1889		De Rothschild, Leopold, D.L., 5, *Hamilton-place, Piccadilly, W.*
1892		De Smidt, Henry, C.M.G., *Norham House, Belvedere-rd., Claremont, S.A.*
1909	*d*	De Thau, Baron Albin, 28, *Walton-street, Hans-place, S.W.*
1906		De Vine, John M., *Royal National Hospital for Consumption, Ventnor, Isle of Wight.*
1892		Dewar, William N., *c/o The Colonial Mutual Life Assurance Soc., Ltd.*, 33, *Poultry, E.C.*
1900		Dewsnup, Professor Ernest R., M.A., F.R.G.S., *University of Illinois, Urbana, Ill., U.S.A.*
1906	*d*	*Dick, Godfrey W., A.I.A.N., *c/o P.O. Box No.* 28, *The Point, Port Natal, S. Africa.*
1908		Dickson, Professor Henry N., M.A., D.Sc., F.R.S.E., *The Lawn, Upper Redlands-road, Reading.*
1903		Digby, W. Pollard, 28, *Victoria-street, S.W.*
1899	*d*	Dougharty, Harold, A.I.A., F.C.I.S., "*Ardnaree,*" *Stanthorpe-road, Streatham, S.W.*
1894	*c d p*	Drage, Geoffrey, M.A., 29, *Cadogan-square, S.W.*
1897	*c d p*	**Dudfield, Reginald**, M.A., M.B., 19, *Blomfield-road, Maida Vale, W.*
1895	*c*	Dudley, The Right Hon. The Earl of, *c/o John Tryon, Esq.*, 1, *New-square, Lincoln's Inn, W.C.*
1909		Duffell, James H., A.I.A., *Royal London Mutual In. Soc., Ltd., Royal London House, Finsbury-sq., E.C.*
1911		Dunbar, Alexander, *Board of Agriculture and Fisheries*, 3, *St. James's-square, S.W.*
1902	*c d*	**Dunbar, Sir William C., Bart.**, C.B., 8, *Onslow-square, S.W.*
1908		Dungey, Miss M. E., B.Sc., *Glendower, Clinton-road, Redruth, Cornwall.*
1878	*c*	*Dunraven, The Right Hon. the Earl of, K.P., C.M.G., *Kenry House, Putney Vale, S.W.*
1910		*Duveen, Edward J. *Gangmoor, Hampstead Heath, N.W.*
1904		Dymant, Arthur F., *Rowantree House, Winchmore Hill.*

Year of Election.		
1888	*d*	Eckersley, J. C., M.A., F.R.G.S., *Carlton Manor, Yeadon, Leeds.*
1883	*c d p*	Edgeworth, Prof. Francis Y., M.A., F.B A., *All Souls', Oxford.*
1910		Edwardes, Sydney, 5, *Clive-street, Calcutta, India.*
1896	*p*	Edwards, C. Lewis, F.S.A.A., "*Santa Caterina,*" *Loudwater, Bucks.*
1907	*d*	Elderton, William Palin, F.I.A., 74, *Mount Nod-road, Streatham, S.W.*
1908		Eldridge, Ernest E. B., A.I.A., 39-41, *New Broad-street, E.C.*
1908	*d*	Ellinger, Barnard, *Ashleigh, Buxton.*
1885	*c d p*	Elliott, Sir Thomas H., K.C.B., *Board of Agriculture and Fisheries*, 4, *Whitehall-place, S.W.*
1885		Elliott, William, *Southern Life Office, Cape Town.*
1889	*d*	Erhardt, William, 61^{I}, *Bismarckstr: Charlottenburg-Berlin.*
1910		Eve, H. Trustram, 2, *St. Paul's-square, Bedford.*
1896		Everett, Percy W., *Oaklands, Elstree, Herts.*
1877	*c d p*	Eversley, The Right Hon. Lord (*Hon. Vice-President*), 18, *Bryanston-square, W.*

Year of Election.		
1892		Faber, Harald, *Fiona, Lennard-road, Penge, S.E.*
1910		Fabini, Herman Victor, "*Woodchester,*" *Stanthorpe-rd., Streatham, S.W.*
1889	*d*	Farnworth, Edward J., F.S.A.A., 26, *Winckley-square, Preston.*
1900	*d*	Farrer, The Right Hon. Lord, *Abinger Hall, Dorking.*
1890		Faulks, Joseph E., B.A., F.I.A. 83, *Brondesbury-road, N.W.*
1893		*Fawcett, Mrs. M. G., 2, *Gower-street, W.C.*
1882		Fell, Arthur, M.A., M.P., 46, *Queen Victoria-street, E.C.*

Year of Election.		
1894		Fellows, Rowland H., F.I.A., 41, *Montrose-avenue*, *Kilburn*, *N.W.*
1889		*Finlay, Major Alexander, *The Manor House*, *Little Brickhill*, *Bletchley.*
1900	*d*	Fisher, Professor Irving, Ph.D., *Yale University*, *New Haven*, *Conn.*, *U.S.A.*
1888		Fisher, Sir Walter N., F.C.A., 4, *Waterloo-street*, *Birmingham.*
1885		*Fitz-Gerald, Lt.-Col. Wm. G., M.A., F.R.Hist.S.,
1900	*d*	Fleming, Owen, Assoc. R.I.B.A., 3, *Warwick House-street*, *Charing Cross*, *S.W.*
1893	*c d p*	***Flux, Alfred W.**, M.A. (*Hon. Secretary*), *Board of Trade*, *Gwydyr House*, *Whitehall*, *S.W.*
1882		Foley, Patrick J., *Pearl Insurance Company*, *Adelaide-place*, *London Bridge*, *E.C.*
1889	*d*	Foot, Alfred, *Melbury*, *Foxley-lane*, *Purley*, *Surrey.*
1893		Fortune, David, J.P., *Scottish Legal Life Assurance Society*, 84, *Wilson-street*, *Glasgow.*
1901		Foster, Harry S., D.L., *Grosvenor Mansions*, 82, *Victoria-street*, *S.W.*
1897	*c*	**Fountain, H.**, *Board of Trade*, *Whitehall-gardens*, *S.W.*
1878	*c d*	Foxwell, Professor H. Somerton, M.A., F.B.A. 1, *Harvey-road*, *Cambridge.*
1894		Francis, Joseph, 10, *Finsbury-square*, *E.C.*
1887		Frankland, Frederick W., F.I.A., "*Okataina*," *Foxton*, *Manawata*, *N. Zealand.*
1899		Franklin, Arthur E., 23, *Pembridge-gardens*, *W.*
1911		Fraser, Drummond Drummond, *Manchester and Liverpool District Bank*, *Manchester.*
1902		Fremantle, Professor Henry E. S., *University of South Africa*, *Cape Town.*
1911		Frewen, Moreton, M.P., *Brede Place*, *Sussex.*
1886		Fuller, George P., *Neston-park*, *Corsham*, *Wilts.*
1878		Fuller, William P., *Stone Lodge*, *Cheam*, *Surrey.*
1908		Furniss, Henry S., M.A., *Whirlow House*, *Oxford.*

Year of Election.		
1902		Gait, Edward A., I.C.S., C.I.E., *Census Commissioner for India, Simla, India.*
1852		Galsworthy, Sir Edwin H., J.P., 26, *Sussex-place, Regent's-park, N.W.*
1887	*d*	Garcke, Emile, *Electrical Federation Office, Kingsway, W.C.*
1910		Garnsey, Gilbert Francis, 3, *Frederick's-place, Old Jewry, E.C.*
1909		Gaskell, Thomas Penn, M.I.C.E., *Townshend House,* *North-gate, Regent's-park, N.W.*
1904		*Gates, Chasemore P., *c/o Anglo-Chilian Nitrate and* *Railway Company, Tocopilla, Chile.*
1880		*Gates, John B., A.C.A., 1 *and* 2, *The Exchange, Southwark, S.E.*
1899	*d*	Gelling, Benjamin R., *Mutual Life Assn. of Australasia, Sydney, N.S.W.*
1907		Gemmill, William, F.I.A., *P.O. Box* 809, *Johannesburg, S. Africa.*
1909		Ghosh, Devendra Nath., B.A., F.R.E.S., *Dpty. Spndnt.,* *Commercial Intell. Dept.*, 5, *Clive-st., Calcutta.*
1885		Gibb, Sir George S., *Underground Electric Ry. Co.,* *Electric Ry. House, Broadway, Westminster, S.W.*
1900		Gladwell, Sydney W., 59, *Palace-street, Victoria-street, S.W.*
1860	*c d p*	Glover, Sir John, J.P., *Highgate Lodge, West-hill, Highgate, N.*
1901	*d*	Godfrey, Ernest H., *Census and Statistics Office,* *Dept. of Agriculture, Ottawa, Canada.*
1910		Goldman, C. S., M.P., *Salisbury House, E.C.*
1903		Goldman, Leopold, A.I.A., F.C.A., *N. American Life* *Assurance Co.*, 112–118, *King-st. West, Toronto.*
1897	*c d p*	Gomme, Sir George L., F.S.A., *London County Council, Spring-gardens, S.W.*
1884	*d*	*Gonner, Professor Edward C. K., M.A., *University College, Liverpool.*
1901		*Gooch, Henry C., 17, *Oxford-square, W.*
1900	*d*	Goodsir, George, *c/o Messrs. Weddel & Co.*, 16, *St. Helen's-pl., E.C.*
1892		Goodwin, Alfred, M.A., 2, *Charles-road, St. Leonards, Sussex.*
1899		Gordon, Charles H. F., *Pitlurg, Beacon Hill, Hindhead, Surrey.*
1908		Gough, George W., B.A., 57, *Kenilworth-avenue, Wimbledon, S.W.*
1911		Gough, The Right Hon. Viscount, K.C.V.O., 9, *Upper Belgrave-street, S.W.*
1887		Gover, Frederic F., 10, *Lee-park, Blackheath, S.E.*

Year of Election.		
1893		*Gray, The Hon. James McL., M.A., F.R.G.S., *c/o R. Todd*, 1, *York-buildings, Adelphi, W.C.*
1904		*Gray, Robert K., 106, *Cannon-street, E.C.*
1895	*d*	Green, John L., 2, *Belmont-park, Lee, S.E.*
1902		Green, Walford D., M.A., *High Garth, Balcombe, Sussex.*
1909	*d*	*Greenwood, Major, M.R.C.S., L.R.C.P., "*Reigate,*" *Lower Park-road, Loughton, Essex.*
1895		Gretton, John, M.P., *Stapleford Park, Melton-Mowbray.*
1911		Griffin, George Herbert, 24, *Essex-street, Strand, W.C.*
1911		Griffin, Harry Hewitt, M.J.I., *St. Oswald's, Putney, S.W., and Guildhall, E.C.*
1905		Gubbay, M. M. Simeon, B.A.,
1910		Gupta, Saratkumar Dutta, M.A., *Treasury Buildings, Calcutta, India.*
1878		Guthrie, Charles, F.C.A., *Moscow Mansions*, 224, *Cromwell-road, South Kensington, S.W.*
1880		*Gwynne, James E. A., J.P., F.S.A., *Folkington Manor, Polegate, Sussex.*
1887		Gwyther, John H., 13, *Lancaster-gate, W.*
1892	*d*	Hadfield, Sir Robert A., *Parkhead House, Sheffield.*
1873	*d*	*Haggard, Frederick T., 1, *Broadwater Down, Tunbridge Wells.*
1903		*Haig, Edric W., M.A., LL.M., *Gatehampton, Goring, Oxon.*
1887		Haldeman, Donald C., *The Rookery, Downe, Kent.*
1897	*d*	Hall, Thomas, *Railway Commissioners' Offices, Sydney, N.S.W.*
1878		Hallett, Thomas G. P., M.A., *Claverton Lodge, Bath.*
1911		Hamer, William Heaton, M.D., F.R.C.P., 55, *Dartmouth Park-hill, N.W.*
1873	*c d p*	HAMILTON, THE RT. HON. LD. GEORGE F., G.C.S.I. (*President*), 17, *Montagu-street, Portman-sq., W.*

Year of Election.		
1884		*Hammersley, Hugh G., *The Grove, Hampstead, N.W.*
1910		Hammond, H. Pierson, *Connecticut Insurance Dept., Hartford, Conn., U.S.A.*
1875		Hankey, Ernest A., *Notton, Lacock, Chippenham.*
1906		Hannon, Patrick J. H., *Clifton Club, Clifton, Bristol.*
1876		Hansard, Luke, 68, *Lombard-street, E.C.*
1886		*Hardcastle, Basil W., 10, *Gainsborough-gardens, Hampstead, N.W.*
1901	*c d p*	HARPER, EDGAR J., *Beech Hurst, Haling Park-road, Croydon.*
1906		*Harper, Robarts, F.R.G.S.
1893		Harrap, Thomas, 143, *Stamford-street, Ashton-under-Lyne, Lancs.*
1868		Harris, David, *Lyncombe Rise, Prior Park-road, Bath.*
1897		Harris, Walter F., F.I.C.A., 13, *Westbourne-avenue, Hull.*
1909		Harrison, C. W. Francis, F.R.G.S., 98, *Victoria-street, S.W.*
1890		Hart, Sir Robert, Bart., G.C.M.G., 38, *Cadogan-place, S.W.*
1900	*p*	Hartley, Edwin L , B.A., 1, *Paper-buildings, Temple, E.C.*
1910		Hart-Synnot, R. V. O., D.S.O., B.Sc. (Lond.), *Ridgmount, Shinfield-road, Reading.*
1910		Haslewood, Bernard, *Colonial Secretary's Department, Maritzburg, Natal.*
1911		Hatch, Sir Ernest F. G., Bart., 20, *Portland-place, W.*
1910		Haw, George, *Derwell Cottages*, 180, *Hampstead Way, N.W.*
1896		Hawkins, Willoughby R., *Bute Docks, Cardiff.*
1897		Hayakawa, S., 69, *Nagatacho-Nichome, Tokio, Japan.*
1895	*d*	Haynes, Thomas H., 17, *Denmark-avenue, Wimbledon.*
1909		Heath, John St. George C., *Woodbrooke, Selly Oak, near Birmingham.*
1911		*Heaton, The Rev. Harold Hjalmar, B.A., *Park View, Waddesdon, Aylesbury.*
1896		*Heaton-Armstrong, William C., J.P., 30, *Portland-place, W.*
1908		Heinicke, Fedor, *Calle Victoria* 618, *Buenos Ayres, Argentina.*

Year of Election.		
1889		*Hemming, Arthur G., F.I.A., *London Assurance Corporation*, 7, *Royal Exchange, E.C.*
1906		Heron, David, M.A., *Galton Eugenics Laboratory, University College, Gower-street, W.C.*
1890	*d*	Hewins, W. A. S., M.A., 15, *Chartfield-avenue, Putney Hill, S.W.*
1886		Hibbert, Sir Henry F., 8, *Park-road, Chorley, Lancashire.*
1911		Hicks, John Cranfield, *Elmwood, Buckhurst-hill, Essex.*
1892	*c d p*	*Higgs, Henry, LL.B., C.B., *The Treasury, Whitehall, S.W.*
1911		Higham, John Sharp, M.P., 25, *Mosley-street, Manchester.*
1878		*Hill, Frederick M., 1, *The Terrace, Camden-square, N.W.*
1904		Hill, William E., 3, *St. Alkmund's-square, Shrewsbury.*
1900		Hillingdon, The Right Hon. Lord, 67, *Lombard-street, E.C.*
1910		Hincke, Ralph D., 128, *Marine-parade, Brighton.*
1906		Hind, Robert, J.P., *Editor, " The Journal," Grahamstown, S. Africa.*
1910		Hirst, Francis Wrigley, 3, *Arundel-street, Strand, W.C.*
1903		Hiscock, Elias J., 51, *Sotheby-road, Highbury, N.*
1909		Hobson, Charles Kenneth, *The Gables, Mount Pleasant, Cambridge.*
1904		Hobson, John A., *Elmstead, Limpsfield, Surrey.*
1908	*d*	Hoffman, Frederick L., *Prudential Insurance Co., Newark, N.J., U.S.A.*
1895		Holland, Hon. Lionel R., 75, *Eaton-square, S.W.*
1898		Holland, Robert M., C.B., 68, *Lombard-street, E.C.*
1901		Holmes, Richard H., J.P. (Alderman), 10, *Royal Arcade, Newcastle-on-Tyne.*
1891	*d*	Hooker, Sir Joseph D., G.C.S.I., F.R.S., &c., *The Camp, Sunningdale.*
1895	*d p*	*Hooker, R. H., M.A., 3, *Holywell-hill, St. Albans.*
1906	*d*	Hooper, Frederick, *Board of Trade*, 73, *Basinghall-street, E.C.*
1904		Hooper, Frederick T., *Fernleigh, St. Mark's Avenue, Leeds.*
1879		Hooper, George N., *Elmleigh, Hayne-road, Beckenham, Kent.*

Year of Election.		
1903	*d*	Hooper, William G., F.R.A.S., 40, *Portland-road, Edgbaston, Birmingham.*
1878	*c d p*	Hooper, Wynnard, 13, *Sumner-place, Onslow-square, S.W.*
1910		Hope, E. W., M.D., L.R.C P., *Public Health Dept., Municipal Offices, Liverpool.*
1887		Hopkins, John, *Little Boundes, Southborough, Kent.*
1899	*d*	Hopkins, J. Castell, *c/o The Annual Review Publishing Co.*, 2, *College-street, Toronto.*
1909	*d*	Hore, C. F. Adair, *Local Government Board, S.W.*
1910		*Howard, Henry Fraser, *Bengal Club, Calcutta.*
1883		Howell, Francis B., *Ethy, Lostwithiel, Cornwall.*
1897	*p*	Howell, Price, *Killara, near Sydney, N.S.W.*
1874	*c d p*	HUMPHREYS, NOEL A., I.S.O. (*Vice-President*), *Ravenhurst, Hook-road, Surbiton.*
1903		Hunt, Arthur L., "*Bryn*," *Somerville-road, Sutton Coldfield.*
1883		Hunt, Richard A., A.I.A. (*Wesleyan & Gen. Ass. Society*), *Steelhouse-lane, Birmingham.*
1903		Hunter, Arthur, *New York Life Ass. Co.*, 346, *Broadway, New York, U.S.A.*
1888		Hunter, Alderman G. B., D.Sc., *Wallsend-on-Tyne.*
1910		Hurst, Thomas J. P., *Hayton, Westbury-road, Woodside Park, N.*
1902	*d p*	Hutchins, Miss B. L., *The Glade, Branch-hill, Hampstead-heath, N.W.*
1888		Hyde, Sir Clarendon G., *Longworth House, Berks.*
1901		Hyde, Hugh V., *Board of Trade*, 21, *St. James's-square, S.W.*
1893	*d*	Hyde, Hon. John, F.R.G.S., F.S.A. Scot., *Lanier Heights, Washington, D.C., U.S.A.*
1874	*d p*	*Ingall, William T. F. M., *Invermark, Limpsfield, Surrey.*
1903		Innes, Alfred M., *British Embassy, Washington, D.C., U.S.A.*

Year of Election.		
1887		Irvine, S. W. D'Arcy, J.P., *Equitable Life Assurance Soc. of U.S.A., c/o Morning Post Building,* 346, *Strand, W.C.*
1907		Irvine, William J., 94, *De Beauvoir-road, De Beauvoir Town, N.*
1910		Jack, Henry J., 65, *Warwick-road, Kensington, W.*
1902		Jagger, John W., *Cape Town.*
1906		James, A. F. Brodie, *Gresham House, Old Broad-street, E.C.*
1894	*d*	Jamieson, George, C.M.G., 180, *St. James's-court, Buckingham Gate, S.W.*
1908		Janisch, Noel, *Colonial Secretary's Office, Cape Town, S. Africa.*
1897	*c d*	JAY, E. A. HASTINGS, *Tower House, Woolwich.*
1881		*Jersey, The Right Hon. the Earl of, G.C.B., *Osterley-park, Isleworth.*
1907	*d p*	*Jevons, H. Stanley, M.A., B.Sc., *Woodhill, Rhiwbeina, near Cardiff.*
1881		Johnson, E. Eltham, 110, *Cannon-street, E.C.*
1910		Johnson, E. Stewart, *The Hospital for Sick Children, Great Ormond-street, W.C.*
1911		Joicey, The Rt. Hon. Lord, *Ford Castle, Cornhill-on-Tweed.*
1905		Jones, John H., *The University, Liverpool.*
1877		Jones, Theodore B., 70, *Gracechurch-street, E.C.*
1888	*d*	*Jordan, William L., *Royal Societies Club, St. James's-street, S.W.*
1889		Justican, Edwin, F.I.A., *St. Mildred's House, Poultry, E.C.; and Royal Societies Club, St. James's-street, S.W.*

Year of Election.		
1910		*Kahn, Stephane, F.R.G.S., 8, *Shelley-court, Tite-street, Chelsea, S.W.*
1902		Kains-Jackson, Charles P. C., 10, *The Green, Richmond.*
1885		Keen, William B., 23, *Queen Victoria-street, E.C.*
1884		Kelly, Edward F., 182—184, *High Holborn, W.C.*
1883	*c d*	Keltie, John Scott, F.R.G.S., LL.D., 10, *Albemarle Mansions, Heath-drive, Finchley-road, N.W.*
1878		Kennedy, J. Murray, *New University Club, St. James's-street, S.W.*
1898		Kent, Arthur C., 176, *Victoria-street, S.W.*
1909		Kerr, Dr. James, M.A., *Educational Offices, Victoria Embankment, W.C.*
1899		Kershaw, John B. C., F.I.C., *West Lancs. Laboratory, Waterloo, Liverpool.*
1905		Keshishian, Agazar, 30, *Church-street, New York, U.S.A.*
1909		Kettle, Bernard, *Guildhall, E.C.* (*Representing the Library Committee of the Corporation of the City of London*).
1909	*d*	Keynes, John M., M.A., *King's College, Cambridge.*
1883	*d*	*Keynes, John N., M.A., D.Sc., 6, *Harvey-road, Cambridge.*
1906		Khras, Minocher J. S., *Khras Bungalow, Middle Colaba, Bombay.*
1884		Kimber, Sir Henry, Bart., M.P., 79, *Lombard-street, E.C.*
1898	*c d*	*KING, A. W. WATERLOW, J.P., *Orchard House, Gt. Smith-st., Westminster, S.W.*
1883	*p*	*King, Bolton, M.A., *Arden Lodge, Warwick.*
1894		*Kirkcaldy, William M., *Dunedin, Otago, New Zealand.*
1909	*d*	Kirkham-Hogbin, P. J., *c/o Medical Officer of Health, Maison Dieu House, Dover.*
1889		Kloetgen, W. J. H., 20–21, *Lawrence-lane, E.C.*
1906	*d*	Knibbs, George H., C.M.G., *Commonwealth Statistician, Melbourne, Victoria.*
1878	*d*	*Kusaka, Yoshio, *First National Bank, Tokio, Japan.*

Year of Election.		
1901	*d*	Lakin-Smith, Herbert, F.C.A., 26, *Waterloo-street, Birmingham.*
1902	*p*	Lark, Albert E., F.C.A., *Hall Quay Chambers*, 2, *South Quay, Great Yarmouth.*
1885	*d*	Latham, Baldwin, M.Inst.C.E., *Parliament-mansions, Victoria-street, S.W.*
1910		Laughton, A. M., *Government Statist, Melbourne, Victoria.*
1897	*d*	*Lawrence, Frederick W., M.A., 87, *Clement's-inn, W.C.*
1890	*d*	Lawson, William R., *Finchley Lodge, North Finchley, N.*
1908		Layton, Walter T., *Caius College, Cambridge.*
1883	*d*	*Leadam, Isaac S., M.A., 1, *The Cloisters, Temple, E.C.*
1905	*d*	*Leake, Percy D., 25, *Abchurch-lane, E.C.*
1911		Leask, Peter, M.A., 212, *West George-steet, Glasgow.*
1910		Lee-Nash, Walter, *The Office of Woods*, 1, *Whitehall, S.W.*
1879		*Leete, Joseph, *Eversden, South Norwood-park, S.E.*
1887		Leitch, Alexander (*Scottish Provident Institution*), 3, *Lombard-street, E.C.*
1907		Lempfert, R. G. K., M.A., 66, *Sydney-street, Chelsea, S.W.*
1892		Leon, Sir Herbert S., Bart., *Bletchley-park, Bletchley, Bucks.*
1905		Leonhardt, F. von, 23, *Austin Friars, E.C.*
1888		*Le Poer-Trench, Col. The Hon. W., R.E., J.P., *St. Hubert's, Gerrard's-cross, R.S.O., Bucks.*
1887		*Le Roy-Lewis, Lieut.-Colonel Herman, D.S.O., *Westbury House, Petersfield, Hants.*
1910		*Leslie, Robert, *Brier Cottage, Aberdour, Fife.*
1899		L'Estrange, Charles J.,
1898		Leveaux, Arthur M., A.I.A., *Registry of Friendly Societies*, 28, *Abingdon-st., Westminster, S.W.*

Year of Election.		
1908		*Lever, Sir William H., Bart., *The Hill, Hampstead Heath, N.W.*
1903	*d*	Levy, Professor Hermann, *Kussmaulstr.* 10, *Heidelberg, Germany.*
1908		Lewis, Hugh (*L'pool, London & Globe Insurance Co.*), 1, *Cornhill, E.C.*
1862	*d*	Lewis, Robert, 1, *Bartholomew-lane, E.C.*
1888		*Liberty, A. Lasenby, *The Manor House, The Lee, near Gt. Missenden.*
1902	*d*	Litchfield, Frederick, 35, *Hampstead Way, Hendon, N.W.*
1898		Litkie, Valerian A., 39, *South-street, W.*
1892		Llewelyn, Sir John T. D., Bart. *Penllergaer, Swansea.*
1903		*Lloyd, Godfrey I. H., *The University of Toronto, Canada.*
1888	*c d p*	Loch, Professor Charles S., D.C.L., *Drylaw Hatch, Oxshott, Leatherhead.*
1882	*c d p*	*Longstaff, George B., M.A., M.D., F.R.C.P., *Highlands, Putney Heath, S.W.*
1907	*d*	Lord, Samuel, A.S.A.A., 18, *Lynton-road, Acton, W.*
1876		*Lornie ,John G., J.P. (*of Birnam & Pitcastle*), *Rosemount, Kirkcaldy, N.B.*
1886		*Low, Malcolm, 22, *Roland-gardens, S.W.*
1909		*Lubbock, The Hon. Harold Fox Pitt, *High Elms, Orpington, Kent.*
1903		Lunge, Ernest, LL.D., 2, *Plowden-building, Temple, E.C.*
1908		Lupton, William, *Ruskin Press, Stafford-street, Birmingham.*
1904	*d*	Lutterveld, Willem M. J. van, *Schiedamsche Singel, Rotterdam, Holland.*
1905		Lynch, William H., *Highfield, Loom-lane, Radlett.*

1875		*Mabson, Richard R., "*Statist*" *Office*, 51, *Cannon-street, E.C.*
1894		Macaulay, Thomas B., *Sun Life Assurance Co., Montreal, Canada.*

Year of Election.		
1888		McCankie, James, 129A, *George-street, Edinburgh.*
1903		MacConochie, William P., *Glengariff, New Barnet.*
1902		Macdonald, John H., 47, *Parliament-street, Westminster, S.W.*
1897		MacDonald, Mrs. M. E., 3, *Lincoln's Inn Fields, W.C.*
1898		*Macdonald, Robert A., *Royal Bank of Scotland, Edinburgh.*
1872	*c d p*	Macdonell, Sir John, C.B., LL.D., *Room* 183, *Royal Courts of Justice, W.C.*
1873		*McEwen, Laurence T., *c/o R. A. McLean,* 1, *Queen Victoria-st., E.C.*
1905		Macgregor, D. H., M.A., *The University, Leeds.*
1886		*Mackenzie, Colin, F.R.G.S.,
1876		*McLean, Robert A., F.R.G.S., 1, *Queen Victoria-street, E.C.*
1888	*d*	McNiel, Henry, 18, *Exchange-street, Manchester.*
1904		Macrosty, Henry W., B.A., 29, *Herrey-road, Blackheath, S.E.*
1899		*MacWharrie, Niel M.,
1906	*d*	Magnus, Sir Philip, M.P., 16, *Gloucester-terrace, Hyde Park, W.*
1891		Maidment, Thomas, *Insurance Chambers, King's-road, Southsea.*
1910	*d*	Malachowski, N. J., *Witebskaia Ulica,* 15, *St. Petersburg, Russia.*
1904	*c d p*	MALLET, BERNARD, C.B. (*Vice-President*), *General Register Office, Somerset House, W.C.*
1902	*d*	Mandello, Professor Julius G., Ph.D., 1, *Tabor-utca,* 2, *Budapest, Hungary.*
1908		Mann, Joseph, *Hopedene, Coulsdon, Surrey.*
1908		Manohar Lāl, Professor, M.A., *Senate House, Calcutta, India.*
1884		*Manson, Frederick W., *Faircrouch, Wadhurst, Sussex.*
1888		Manuel, James, 36, *Vittoria-street, Ottawa, Canada.*
1910		Marriner, Frederick J., 39, *Warner-road, Hornsey, N.*
1880	*c d p*	*Marshall, Professor Alfred, M.A., *Balliol Croft, Madingley-road, Cambridge.*
1887		Marshall, W. Bayley, M.I.C.E., M.I.M.E., *Imperial Hotel, Malvern.*

Year of Election		
1872	c d p	*Martin, Sir Richard Biddulph, Bart. (*Hon. Vice-President and Treasurer*), 10, *Hill-street, Mayfair, W.*
1911		Martin, The Hon. Joseph, M.P., *Room* 217, *Caxton House, Westminster, S.W.*
1911		Mason, James Francis, M.P., *Eynsham Hall, Witney, Oxon.*
1884		Mason, William A., 31*a*, *Colmore-row, Birmingham.*
1898		Massingberd, Captain Stephen, *Gunby Hall, Burgh, Lincolnshire.*
1875		*Mathers, John S.,
1911		Maxwell, Arthur, *c/o Messrs. Glynn, Mills, Currie and Co.*, 67, *Lombard-street, E.C.*
1910	d	Maynard, G. D., *Pretoria, Transvaal.*
1910		Maynard, H. R., *Kingswood, Antrim-st., Haverstock-hill, N.W.*
1901		Meakin, George H., A.S.A.A., *Town Hall, Islington, N.*
1882		Medhurst, John T., F.S.A.A., *City of London College, Moorfields, E.C.*
1901		Meredith, Hugh O., *Hollycroft, Cavendish-avenue, Cambridge.*
1884	d	Merton, Zachary, 31, *Green-street, Park-lane, W.*
1907		Middleton, Professor Thomas H., M.A., 4, *Whitehall-place, S.W.*
1909		Millard, Percy W., LL.B., 3, *St. James's-square, S.W.*
1900		Miller, John W., *Union Club, S.W.*
1889		*Mills, Major Henry Farnsby,
1892	c d	Milner, The Rt. Hon. Viscount, G.C.B., G.C.M.G., 47, *Duke-street, S.W.*
1882	p	Milnes, Alfred, M.A., 44, *Goldhurst-terrace, S. Hampstead, N.W.*
1907		*Mitchell, Frederick W., *Star Life Assurance Soc.*, 32, *Moorgate-st., E.C.*
1902	d	Molesworth, Sir Guilford L., K.C.I.E., *The Manor House, Bexley, Kent.*
1911		Monckton, H. Percy, 32, *Walbrook, E.C.*
1911		Mond, Sir Alfred M., Bart., M.P., 35, *Lowndes-square, S.W.*
1911		Monkswell, The Right Hon. Lord, *Harold's Haven, Taplow, Bucks.*
1899		*Moon, Edward R. P., 6, *Onslow Gardens, W.*

Year of Election.		
1887		Moore, Arthur C., 23, *Essex-street, Strand, W.C.*
1874		Moore, Charles R., 43, *Breakspears-road, St. Johns, S.E.*
1885		Moore, Harold E., F.S.I., *Oaklands, Beckenham.*
1878		*Moore, John B. G., *Loymount, Cookstown, Ireland.*
1903		Moores, George, 14, *Cross-street, Manchester.*
1909	*d*	Morgan, Ben. H., *Caxton House, Westminster, S.W.*
1910		Morgan, H. Allan, *Holmwood, Knutsford, Cheshire.*
1893	*d*	Morgan, Percy C., *Queen Anne's Chambers, S.W.*
1909		Morison, Hector McDonald, A.C.A., *Oakwood, Park Hill-road, Croydon.*
1902	*c*	MORISON, SIR THEODORE, M.A., K.C.I.E., *Ashleigh, St. George's-road, Weybridge.*
1909		Morris, R. Denman, 10, *Carlingford-road, Hampstead, N.W.*
1891	*c d p*	Morrison, Rev. William D., LL.D., *The Rectory, Marylebone Church, Marylebone-road, N.W.*
1911		Mortara, Professor Giorgio, *Piazza Cavour* 19, *Rome, Italy.*
1904	*d*	Mosely, Alfred, C.M.G., *West Lodge, Hadley Wood, Barnet.*
1885		*Mosley, Tonman, C.B., *Bangors, Iver, Uxbridge.*
1886	*c*	Mowbray, Sir Robert G. C., Bart., 90, *Piccadilly, W.*
1886	*d*	Moxon, Thomas B., *Lancs. and Yorks. Bank, King-st., Manchester.*
1904		Mudie-Smith, Richard, 9, *Clifton-villas, Maida Vale, W.*
1883		Muirhead, Henry J., *Fairfield, Hythe, Kent; and Reform Club, S.W.*
1899	*d*	Muirhead, James M. P., J.P., F.R.S.E., F.R.S.L., F.S.A.A., F.C.I.S., F.R.C.I., *Box* 1161, 57, *St. George's-street, Cape Town.*
1910		Mukherji, Pramatha Nath, M.A., 9, *St. James's-square, Calcutta, India.*
1905		Muller, Osvald V., M.A., *Elphinstone College, Bombay; and Newquay, Cornwall.*
1891	*c d*	MURPHY, SIR SHIRLEY F., F.R.C.S., 9, *Bentinck-terrace, Regent's-park, N.W.*

Year of Election.		
1909		Nathan, Eric Burnett, A.I.A., 99, *Portsdown-road, W.*
1878		*Nathan, Henry,
1907		Nathan, Sir Nathaniel, K.C., *Queen's House, St. James's-court, S.W.*
1908		Neill, Samuel B., 13*a*, *Canton-road, Shanghai, China.*
1908		Neill, Thomas, *The Pearl Life Assurance Co., Ltd., London Bridge, E.C.*
1869	*c d p*	Neison, Francis G. P., F.I.A., *The Hollies, Ringley-park, Reigate.*
1877		Nevill, C. Henry, 1 *and* 2, *Great Winchester-street, E.C.*
1905		Nevill, Henry R., *Allahabad, U.P., India.*
1900		Newcomb, Harry T., LL.M., *Bethesda, Montgomery County, Md., U.S.A.*
1889	*c d p*	NEWSHOLME, ARTHUR, M.D., 57, *Northgate, Regent's-park, N.W.*
1895		*Nicholson, Charles N., M.P., 35, *Harrington-gardens, South Kensington, S.W.*
1878	*d p*	Nicholson, Professor J. Shield, M.A., D.Sc., F.B.A., *University of Edinburgh.*
1871		*Noble, Benjamin, F.R.A.S., *Westmorland House, Low Fell, Gateshead.*
1889		Northampton, The Most Hon. the Marquess of, 51, *Lennox-gardens, S.W.*
1888		Oakley, Sir Henry, 37, *Chester-terrace, Regent's-park, N.W.*
1886	*d*	O'Conor, James E., C.I.E., 144, *Church-road, Upper Norwood, S.E.*
1901		Offen, Charles R. W., *Bloomsbury House, Cartwright-gardens, W.C.*

Year of Election.		
1911		*Oke, Alfred William, B.A., L.L.M., F.S.A., 115, *Highfield-lane, Southampton.*
1885	*d*	*Oldham, John (*River Plate Telegraph Co.*), 287, *San Martin, Buenos Ayres.*
1909		O'Malley, L.S.S., I.C.S., *United Service Club, Calcutta, India.*
1892	*c p*	ONSLOW, THE RIGHT HON. THE EARL OF, G.C.M.G. (*Hon. Vice-President*), 7, *Richmond-terrace, Whitehall, S.W.*
1878		Oppenheim, Henry, 16, *Bruton-street, Bond-street, W.*
1899		Ormsby, John Y., *c/o Burnett, Ormsby Clapp & Co.,* 7, *Melinda-street, Toronto.*
1909		Osborne, James Henry, F.R.G.S., *Knoyle House, Ealing, W.*
1910		Osborne, Ralph Stanley, 55, *Clarendon-road, W.*
1887	*d*	*Page, Edward D., *Oakland, Bergen County, N.J., U.S.A.*
1899	*c d p*	PAISH, GEORGE, "*Statist*" *Office*, 51, *Cannon-street, E.C.*
1866	*c d p*	*Palgrave, Sir R. H. Inglis, F.R.S., *Henstead Hall, Wrentham, Suffolk.*
1906		Parish, Walter Woodbine, 9, *Courtfield-road, S.W.*
1908		Parker, Charles Sandbach, *Demerara-buildings, St. Dunstan's-hill, E.C.*
1903		Parker, Sir Gilbert, M.P., 20, *Carlton House-terrace, S.W.*
1891		Parker-Smith, The Rt. Hon. James, 20, *Draycott-place, S.W.*
1883		Paterson, John, 1, *Walbrook, E.C.*
1910		Pattin, H. Cooper, M.A., M.D. (Cam.), *Municipal-buildings, Norwich.*
1888		Pattullo, James Durie. 65, *London Wall, E.C.*
1878	*d*	Paulin, Sir David. 6, *Forres-street, Edinburgh.*
1893	*d*	Payne, Alexander W., F.C.A., 70, *Finsbury-pavement, E.C.*

Year of Election.		
1884		*Peace. Sir Walter, K.C.M.G., I.S.O., 83, *Victoria-street, Westminster, S.W.*
1910		Peacock, Walter, M.V.O., 3, *Buckingham-gate, S.W.*
1910		Peake, Edward Gordon, *Oxford and Cambridge Club, Pall Mall, S.W.*
1909		Pearce, A. James, A.C.A., *Corn Exchange Chambers, Princes-st., Ipswich.*
1895		Peixotto, M. Percy (*U.S. Equitable Life Office*), 36, *Avenue de l'Opéra, Paris.*
1903		Pekelharing, Dr. G., 11, *Zeemansstraat, Rotterdam.*
1891	*d*	Penn-Lewis, William, "*Cartref,*" *Toller-road, Leicester.*
1892		*Pentland, The Right Hon. Lord, 7, *Cambridge-square, W.*
1911		Pepper, James, *Silverdale, Palmerston-street, Derby.*
1906		Perkins, Herbert H. W., *Bolton-chambers, Eastbourne.*
1890		Peters, John W., 5, *King's-road, Southsea.*
1886		Peto, Sir Henry, Bart., M.A., *Chedington Court, Misterton, Crewkerne.*
1887	*d*	Phelps, Lieut.-General Arthur, 23, *Augustus-road, Edgbaston, Birmingham.*
1908	*d*	Phelps, E. Bunnell, M.A., "*The American Underwriter,* 141, *Broadway, New York City, U.S.A.*
1886	*d*	*Phelps, Rev. Lancelot R., M.A., *Oriel College, Oxford.*
1900	*d*	*Pigou, Professor Arthur C., M.A., *King's College, Cambridge.*
1904		Pilling, John A., *c/o Messrs. Deloitte and Co.,* *Florida* 77, *Buenos Ayres.*
1878	*d*	*Pim, Joseph Todhunter, *Rinnamara, Monkstown, Co. Dublin.*
1903		Pirrie, The Right Hon. Lord, K.P., LL.D., *Downshire House, Belgrave-square, S.W.*
1881		Planck, Deputy Surgeon-General Charles, M.R.C.S., *Lyden Croft, Edenbridge, Kent.*
1902		Plant, Alfred T., *Accountant's Office, G.W.R., Paddington, W.*
1901		Plender, Sir William (*c/o Messrs. Deloitte and Co.*), 5, *London Wall-buildings, Finsbury-circus, E.C.*
1861	*c d*	Plowden, Sir William C., K.C.S.I., 5, *Park-crescent, Portland-place, W.*
1905		Pocock, Bernard G., A.S.A.A., 197, *High Holborn, W.C.*
1896		*Pontifex, Bryan, A.C.A., *Imperial Bank-buildings, Toronto, Canada.*

Year of Election.		
1891		Potter, Henry, *Normanhurst, Grosvenor-rd., Westcliffe-on-Sea, Essex.*
1879	*c d p*	*Powell, Sir Francis S., Bart. (*Honorary Vice-President*), 1, *Cambridge-sq., Hyde-park, W.*
1877		*Prance, Reginald H., *Frognal, Hampstead, N.W.*
1867		*Pratt, Robert L., 13, *Danesbury-terrace, Darlington.*
1896		Pretyman, Captain Ernest G., M.P., *Orwell-park, Ipswich.*
1887	*c d p*	*Price, L. L., M.A. *Oriel College, Oxford.*
1877	*c d p*	Price-Williams, Richard, *Revelstoke, St. Gabriel's-rd., Brondesbury, N.W.*
1909		Pritchard, Arthur, M.A., 3, *Temple-gardens, Temple, E.C.*
1887	*c d p*	Probyn, Sir Lesley, K.C.V.O. (*Vice-President*), 79, *Onslow-square, S.W.*
1889		Probyn, Lieut.-Colonel Clifford, 55, *Grosvenor-street, Grosvenor-square, W.*
1886	*d*	Provand, Andrew D., 2, *Whitehall-court, S.W.*
1896		Pryor, Edward T., 23, *Fore-street, E.C.*
1901		Quin, Stewart B., F.C.A., 16, *Donegall-square South, Belfast.*
1883		Rabbidge, Richard, F.C.A., 32, *Poultry, E.C.*
1872	*d p*	*Rabino, Joseph, *The Godwins, Christchurch-park, Sutton.*
1858		*Radstock, The Right Hon. Lord, *Mayfield, Woolston, Southampton.*

Year of Election.		
1885	*c d*	Rae, John, M.A., 1, *Rockland-road, Putney, S.W.*
1887	*d p*	Raffalovich, His Excellency Arthur, 19, *Avenue Hoche, Paris.*
1909		Raghunatha Rao, C. S. (*Agricultural Research Institute*), *Pusa, Bengal, India.*
1880	*c*	Rankin, Sir James, Bart., M.P., *Bryngwyn, Hereford.*
1897		Ranson, Albert, *Tavern-street, Ipswich.*
1903		Rathbone, Miss Eleanor F., *Green Bank, Liverpool, E.*
1874	*c d p*	*Ravenstein, Ernest G., F.R.G.S., Ph.D., 2, *York-mansions, Battersea-park, S.W.*
1877		*Rawlins, Thomas, 45, *King William-street, E.C.*
1910	*d*	Rea, Peter Mackenzie, *Merton House, Salisbury-sq., Fleet-street, E.C.*
1908		Reade, Herbert Vincent, 32, *Palace Gardens-terrace, Kensington, W.*
1889		*Reed, Thomas, F.C.A., 63, *King-street, South Shields.*
1908		Reid, George T., B.Sc., *Trade Boards Office, Board of Trade, S.W.*
1906	*d*	Rennie, James Stuart M., *Tangong Pagar Docks, Singapore, Straits Settlements.*
1888	*c d p*	Rew, R. H. (*Hon. and Hon. Foreign Sec.*), *Board of Agriculture & Fisheries*, 3, *St. James's-square, S.W.*
1895		Richards, Roger C., *Cader House, Foxley-lane, Purley.*
1909		Ridley, Rt. Hon. Viscount, 10, *Carlton House-terrace, S.W.*
1903		Ripon, The Right Rev. the Lord Bishop of, *The Palace, Ripon.*
1892		Rivington, Francis H., 44, *Connaught-square, W.*
1882		Roberts, Edward, I.S.O., F.R.A.S., *Park Lodge, Court-road, Eltham.*
1894	*d p*	Robertson, J. Barr, 10, *Walbrook, E.C.*
1900		Robinson, James, 10, *Alma-place, North Shields.*
1880		*Ronald, Byron L., 14, *Upper Phillimore-gardens, W.*
1873	*c*	*Rosebery, The Rt. Hon. the Earl of, K.G., K.T., F.R.S., 38, *Berkeley-square, W.*
1904	*c d p*	Rosenbaum, Simon, M.Sc., 94, *Barrow Gate-road, Chiswick, W.*
1892	*d*	Ross, C. Edmonstone, F.S.A.A., *Chief Examiner of Accounts, N.W.R., Lahore, India.*

Year of Election		
1904		Routly, William H., F.S.A.A., *Borough Treasurer, Folkestone.*
1911		Rowallan, The Rt. Hon. Lord, *Rowallan, Kilmarnock, and* 26, *Hans-place, S.W.*
1911		Rowland, John, *The Treasury, Whitehall, S.W.*
1899	*d*	Rowntree, B. Seebohm, 32, *St. Mary's, York & The Homestead, Clifton, York.*
1898	*d p*	Rozenraad, Cornelius, 4, *Moreton-gardens, South Kensington, S.W.*
1890		Ruffer, Marc A., C.M.G., M.A., M.D., B.Sc., *Ramleh, Egypt.*
1903		Runciman, Rt. Hon. Walter, M.P., *Doxford, Chathill, Northumberland.*
1888	*d*	Rusher, Edward A., F.I.A., 142, *Holborn Bars, E.C.*
1886		Russell, Arthur B., F.C.A., *Marlborough House,* 11, *Ludgate-hill, E.C.*
1910		Russell, Hon. Francis Albert Rollo, *Steep, Petersfield, Hants.*
1878	*d*	Russell, Richard F., 160, *Milfort-road, Thornton Heath, Croydon.*
1907	*d*	Rutter, Frank R., Ph.D., *Bureau of Statistics,* *Dept. of Agriculture, Washington, D.C., U.S.A.*
1907		Rye, Reginald A., *Goldsmiths' Librarian,* *University of London, South Kensington, S.W.*
1894	*d*	Sachs, Edwin O., 10A, *Waterloo-place, Pall Mall, S.W.*
1909		*Sale, Charles V., 40, *Threadneedle-street, E.C.*
1898	*d*	Salmon, Richard G., F.I.A., *Oakdale House, Oakdale-road, Streatham, S.W.*
1875	*d*	*Salomons, Sir David L., Bart., J.P., *Broom-hill, Tunbridge Wells.*
1908	*d*	Samuel, George A. H., *Morden House, Catford.*
1899	*d*	Sanderson, Frank, M.A., *Canada Life Ass. Co., Toronto, Canada.*
1895	*c*	SANGER, CHARLES P., M.A., 58, *Oakley-street, Chelsea, S.W.*
1891		*Sarda, Pandit Har Bilas, B.A., M.R.A.S., *Government College, Ajmere, India.*

Year of Election.		
1886	*d p*	Sauerbeck, Augustus, *Messrs. H. Schwartze & Co.*, 3 & 4, *Moorgate-street-buildings, E.C.*
1910		Saunders, Alexander, M.C. (B.A., Oxon.), B2, *The Albany, Piccadilly, W.*
1887		*Scarth, Leveson, M.A., 84, *Oakwood-court, Kensington, W.*
1904		*Schlesinger, Louis G., 12A, *Avenida Sur* 16B, *Guatemala.*
1891	*d p*	*Schloss, David F., M.A., 18, *Hornton Court, Kensington, W.*
1908	*d*	Schmidt, Arno, 22, *St. Mary's-gate, Manchester.*
1895		Schmidt, Hermann, 36A, *Ampthill-square, N.W.*
1891	*d p*	Schooling, J. Holt, *Fotheringhay Hse., Montpelier-row, Twickenham.*
1908		Schumpeter, Dr. Joseph A., *University of Czernovitz, Czernovitz, Austria.*
1895	*d*	Schuurman, Willem H. A. Elink, *Godelindeweg*, 10, *Hilversum, Holland.*
1883		*Schwann, John F., *Oakfield, Wimbledon, S.W.*
1880		*Seeley, Sir Charles, Bart., *Sherwood Lodge, Nottingham.*
1905		Sellar, Alexander S., M.A., 95, *Culverley-road, Catford, S.E.*
1899		Setchfield, George B., *Beulah Kop*, 3, *Clarkson-street, Sheffield.*
1886	*d p*	Seyd, Ernest J. F., *Cider Mill Hatch, Newdigate, Surrey.*
1905	*d*	Seyd, Richard E. N. J., 38, *Lombard-street, E.C.*
1908		Shakir Ali, Mahomed, *Barrister-at-Law*, *Basti, United Provinces, India.*
1909		Sharp, Clifford Dyce, *Woodside Corner, Erskine-hill, Hendon, N.W.*
1898	*c d p*	SHAW, WILLIAM N., D.Sc., F.R.S., 10, *Moreton-gardens, South Kensington, S.W.*
1907		Sheffield, The Right Hon. Lord, 18, *Mansfield-street, W.*
1898	*d*	Sherwell, Arthur, 102–3, *Bedford Court-mansions, W.C.*
1888		Shillcock, Joshua, M.A., *Bank of England, Burlington-gardens, W.*
1907		Shimmell, James E., A.I.A., *c/o British Legal Life Assurance Co., Ltd.*, 78, *New Oxford-st., W.*
1904	*c*	SIM, J. D. STUART, *Reg. of Friendly Societies*, 28, *Abingdon-st., S.W.*
1907	*d*	Simon, André L., 24, *Mark-lane, E.C.*

Year of Election.			
1902			Sinclair, H. D., 19 *and* 20, *Silver-street, Wood-street, E.C.*
1910			Slough, William Henry, 28, *Claverley-grove, Church End, Finchley, N.*
1906			Smith, Charles, 11, *Winter-street, Sheffield.*
1878	*d*		*Smith, George, LL.D., C.I.E., 10, *South Learmouth-gardens, Edinburgh.*
1889	*d*		Smith, G. Armitage, M.A., D.Sc., 3, *Albert-terrace, Regent's-park, N.W*
1904			*Smith, H. B. Lees, M.A., M.P., *Latimer House, Church-street, Chiswick, W.*
1906			Smith, Horace A., *Bureau of Statistics, Sydney, N.S.W.*
1877			Smith, Howard S., F.C.A., A.I.A., F.F.A., *Bank Chambers,*14, *Waterloo-street, Birmingham*
1888	*c d*		Smith, Sir H. Llewellyn, K.C.B., B.Sc., *Oakfield Lodge, Ashtead.*
1901			Smith, Robert J., C.A., 163, *West George-street, Glasgow.*
1905			Smith, Stanley G., 131, *Muswell-avenue, Muswell-hill, N.*
1894			*Smith, The Hon. William F. D., M.P., 3, *Grosvenor-place, S.W.*
1908			Smith, William H., F.S.A.A., " *Belmont,*" *Ferriby-road, Hessle, E. Yorks.*
1894			Smithers, Frederick O., 171, *Adelaide-road, South Hampstead, N.W.*
1910			Snow, Ernest Charles, *Sir John Cass's Institute, Jewry-street, E.C.*
1900	*c*	*p*	*SOMERVILLE, PROFESSOR WILLIAM, M.A., D.Sc., 121, *Banbury-road, Oxford.*
1899			Sorley, James, F.I.A., F.F.A., F.R.S.E., 82, *Onslow-gardens, S.W.*
1904			Souter, John, *c/o Mines Department, P.O. Box* 1132, *Johannesburg.*
1897			Southgate, Henry W., 29, *Hamilton-avenue. Chapletown, Leeds.*
1881			Southwark, The Rt. Hon. Lord, M.P., 12, *Devonshire-place, Portland-place, W.*
1895			Soward, Alfred W., 28, *Therapia-road, Honor Oak, S.E.*
1855	*d*		Sowray, J. Russell, " *Fairlawn,*" *Teston, Maidstone.*
1904			Sowrey, John W., " *Beaconsfield,*" *Devonshire-road, Merton, S.W.*
1911			Spain, Frederick G. L., 35, *Wool Exchange, E.C.*
1896			Sparrow, Frederick S., 84, *Pitt-street, Sydney, N.S.W.*

Year of Election.		
1906		Spear, Bertram E., *Duneira*, 277, *Willesden-lane, N.W.*
1904		Spencer, Frederick H., LL.B., "*Elm Grove Cottage*," *Pinner, Middlesex.*
1867		*Spencer, Robert J.,
1892		Spender, John A., M.A., 45, *Sloane-street, S.W.*
1897	*d*	Spensley, J. Calvert, *The Chalcots, England's-lane, Hampstead, N.W.*
1911		Speyer, The Rt. Hon. Sir Edgar, Bart., 46, *Grosvenor-street, W.*
1883		Spicer, Sir Albert, Bart., M.P., 50, *Upper Thames-street, E.C.*
1856	*d*	*Sprague, Thomas B., M.A., LL.D., F.I.A., 29, *Buckingham-terrace, Edinburgh*
1882		Stack, Thomas N., 7, *Union-court, E.C.*
1901		Stallard, Charles F., *P.O. Box* 5156, *Johannesburg.*
1911		Stamp, Joseph Charles, 4, *Waldegrave-gardens, Strawberry Hill, Middlesex.*
1902		*Steel-Maitland, Arthur H. D. R., M.P., 72, *Cadogan-square, S.W.*
1899		Stenberg, Ernst G., *Chief Electoral Officer, W. Australia, Perth, W.A.*
1882		*Stern, Sir Edward D., 4, *Carlton House-terrace, S.W.*
1885	*d*	*Stevens, Marshall, *Trafford Park, Manchester.*
1903	*d*	Stevens, William J., "*St. Clair*," *Tyson-road, Forest Hill, S.E.*
1908	*c d p*	*STEVENSON, DR. T. H. C., *General Register Office, Somerset House, W.C.*
1911		Stiles, Clement R., "*Gonville*," *Clarendon-road, Wallington, Surrey.*
1906		*Stock, Edward J., A.I.A., 395, *Collins-st., Melbourne, Victoria, Australia.*
1889		Stow, Major Harry V., 1, *Oxford-court, Cannon-street, E.C.*
1883	*d*	*Strathcona, The Right Hon. Lord, G.C.M.G., 28, *Grosvenor-square, W.*
1909	*d*	Streeter, Rev. Theodore E., *The Vicarage, De Winton, Alberta, Canada.*
1884		*Sugden, Richard. *The Farre Close, Brighouse, Yorkshire.*
1900		Swetenham, Charles C., *c/o Grindlay Groom & Co., Bombay, India.*

Year of Election.		
1900	*d p*	Sykes, John F. J., M.D., D.Sc., 40, *Camden-square, N.W.*
1889	*d*	Tattersall, William, *Melbrook, Bowdon, Cheshire.*
1905		Taylor, William B., B.A., LL.B., 112–118, *King-street West, Toronto.*
1893		Teece, Richard, F.I.A., F.F.A., *Actuary, A.M.P. Society, Sydney, N.S.W.*
1888	*d*	Temperley, William A., junr., 2, *St. Nicholas-buildings, Newcastle-on-Tyne.*
1888		Theobald, John W., 8, *Fairfield-road, Croydon.*
1888	*c d p*	Thomas, David A., M.A., M.P., *Llanwern, near Newport, Mon.*
1905		Thomas, P. Scofield, 220, *Croydon-road, Anerley, S.E.*
1864		*Thompson, Henry Y., 19, *Portman-square, W.*
1909		Thompson, John W., F.F.A., A.I.A., *Hawarden, Cockenzie, N.B.*
1901	*d p*	Thompson, Robert J., *Board of Agriculture, &c.,* 8, *Whitehall-place, S.W.*
1889	*d*	Touche, George A., M.P., *Broomfield, Westcott, near Dorking.*
1911		Towler, William George, 11, *Tothill-street, Westminster, S.W.*
1911		Trachtenberg, Mendel Isidore, B.A., 7, *Lauderdale-road, W.*
1868		*Treatt, Frank B., *Court House, Cowra, New South Wales.*
1868		Tritton, Joseph H., 54, *Lombard-street, E.C.*
1903	*d*	Trivett, John B., *Bureau of Statistics, Sydney, N.S.W.*
1885		Turner, William, *c/o The Librarian,* *Free Public Library, Trinity-street, Cardiff.*
1909		Turnor, Christopher, *Panton Hall, Wragby, Lincolnshire.*
1892	*d*	Tyler, Edgar A., 9, *Old Jewry Chambers, E.C.*

Year of Election.		
1903		Unstead, John F., M.A., F.R.G.S., 39, *Greenholm-road, Eltham Park, S.E.*
1903		*Vaizey, Ker G. R., 10, *Lime-street, E.C.*
1888		Van Raalte, Marcus, 22, *Austin Friars, E.C.*
1889		*Venning, Charles H., *Local Government Mutual Guarantee Soc., Ltd., Lambert House*, 10 *&* 12, *Ludgate-hill, E.C.*
1894		Verney, Frederick W., M.P., *Botolph House, Winslow, Bucks.*
1909		Verney, Harry, B.Sc., B. Comm. LL.B., 13, *Knowsley-street, Bury, Lancs., and Home Office, London, S.W.*
1886	*c*	Verulam, The Right Hon. the Earl of, *Gorhambury, St. Albans.*
1910		Viereck, Johannes, *c/o Wm. Klöpper, Rudlingsmarkstr* 9, *Hamburg, Germany.*
1905		Vigor, Harold D., 196, *Mackenzie-road, Beckenham, Kent.*
1885		Vincent, Frederick J., A.I.A., *London, Eainburgh and Glasgow Assurance Co., Ltd., Euston-square, N.W.*
1904		Vinter, James O., J.P., *Southfield, Trumpington, Cambs.*

Year of Election		
1902		Wacha, Dinsha Edulji, 84, *Hornby-road, Fort, Bombay.*
1905		Wadia, N. P. N., M.S.A.A., 105, *Adelaide-road, N.W.*
1904		Wagner, H. R., *Apartado 792, Mexico, D.F.*
1900		Walford, Adolphus A. B. (*Frank Brown & Co.*), *Finkle Chambers, Stockton-on-Tees.*
1890	*d*	Walford, Ernest L., 47, *Hamilton-terrace, N.W.*
1909		*Walker, James, 6, *Kennedy-drive, Partick, Glasgow.*
1904	*d*	Wall, Walter W., 4, *Bradgate-road, Catford, S.E.*
1905		Wallis, B. Cotterell, F.C.P., B.Sc. (Econ.), *Trevelyan, Holdenhurst-av., North Finchley, N.*
1868		Wallis, Charles J., 16, *Penwerris-terrace, Falmouth.*
1880	*d*	Wallis, E. White, *Cannons-lane, Pinner, Middlesex.*
1908	*d*	Wallis, Percy, *Westacre, Kettering.*
1904		*Walsh, Correa M., *Bellport, Long Island, New York, U.S.A.*
1910		Walsh, Robert F.C.A., 67, *High-street, Belfast.*
1911		Wandsworth, The Rt. Hon. Lord, 10, *Great Stanhope-street, Mayfair, W.*
1893		Ward, William C., F.S.I.A., 113, *Pitt-street, Sydney, N.S.W.*
1888		Warren, Reginald A., J.P., *Preston-place, near Worthing.*
1865		Waterhouse, Edwin, A.I.A., F.C.A., 3, *Frederick-place, Old Jewry, E.C.*
1886	*p*	Waters, Alfred C., *General Register Office, Somerset House, W.C.*
1892		Wates, Charles M., 4, *Garden-road, Bromley, Kent.*
1902	*d*	Watson, Alfred W., F.I.A., *St. Stephen's House, Victoria Embankment, S.W.*
1910		*Watt, James, F.F.A., 24, *Rothesay-terrace, Edinburgh.*
1908		Webb, Augustus D., B.Sc., 5, *St. George's-avenue, Tufnell Park, N.*
1911		Webb, C. Morgan, *Secretariat, Rangoon.*
1888		Webb, Henry B., *Holmdale, Dorking.*
1904	*d*	Webb, The Hon. Montagu de Pomeroy, C.I.E., *Karachi, India.*

Year of Election.		
1893	*d*	Weedon, Thornhill, *Govt. Statistician, Bryn-Mawr, Brisbane.*
1873	*c*	*Welby, The Right Hon. Lord, G.C.B., 11, *Stratton-street, Piccadilly, W.*
1911		*Wellington, His Grace The Duke of, K.G., G.C.V.O., *Apsley House, Piccadilly, W.*
1889		*Wells-Smith, Henry, F.C.A., *Chantrey House, Brookhouse-hill, Fulwood, Sheffield.*
1855	*c d p*	Welton, Thomas A., F.C.A., *Ixworth Court, Stanhope-road, Highgate, N.*
1902	*d*	Westall, George, 87, *Chancery-lane, W.C.*
1879		*Westlake, John, K.C., LL.D., *The River House*, 3, *Chelsea Embankment, S.W.*
1882		*Whadcoat, John H., F.C.A., *Rockcliffe, Kirkcudbrightshire.*
1878		Wharton, James, *Edgehill, Netherhall-gds., Fitzjohn's-av., N.W.*
1887		Whinney, Frederick, 85, *Avenue-road, Regent's Park, N.W.*
1859		Whitbread, Samuel, *Southill-park, Biggleswade, Beds.*
1887		*White, The Rev. George C., M.A., *Nursling Rectory, Southampton.*
1905		White, Richard, F.C.I.S., *Folkestone Chamber of Commerce, Folkestone.*
1910		Whitehead, Alfred North, F.R.S., 17, *Carlyle-square, S.W.*
1888	*d*	Whitehead, Sir James, Bart., J.P., D.L., *Wilmington Manor, near Dartford.*
1895	*d*	Whitehead, The Hon. Thomas Henderson, M.L.C., *Chartered Bank of India, &c., Hong Kong.*
1892	*c d*	Whitelegge, Sir B. Arthur, K.C.B., M.D., 12, *St. Mary Abbott's-terrace, Kensington, W.*
1895		Whittuck, Edward A., M.A., B.C.L., *Claverton Manor, Bath.*
1899		Wiener, Isidore, *Colecroft, Kenley, Surrey.*
1898		Wigham, Matthew T., A.S.A.A., F.C.I.S., 826, *Salisbury House, London Wall, E.C.*
1909		Wilbur, Dr. Cressy L., *Chief Statistician,* *Bureau of the Census, Washington, D.C., U.S.A.*
1901	*d*	Willcox, Walter F., Ph.D., *Cornell University, Ithaca, N.Y., U.S.A.*
1896		*Williams, Major C. Woolmer, 28, *Prebend-mansions, High-road, Chiswick, W.*
1897	*d*	*Williams, Ernest E., *Ecclefechan, Lake-road, Wimbledon, S.W.*

Year of Election.		
1904	*d*	Williams, Frederick A., A.I.A., F.A.S., *Apartado* 1420, *Mexico City, Mexico D.F.*
1864		Williams, F. Bessant, F.S.A. (Scot.), 3, *Essex-grove, Central Hill, Upper Norwood, S.E.*
1907	*d*	Williams, J. P. C. C., Ph.D., M.R.A.S., M.S.A., *P.O. Box* 278, *Calcutta, India.*
1888		*Williams, Robert, M.P., 20, *Birchin-lane, E.C.*
1911		Williams, T. Taliesin, B.A., *Decca College, Decca, Eastern Bengal and Assam.*
1909		Williams, Sydney Fairs, 4. *South-street, Finsbury, E.C.*
1911		Willington, Walter Auwyl, *Derwen,* 172, *Hanover-road, Brondesbury Park, N.W.*
1895		*Willis, J. G., B.A., C.B., *Board of Trade, Whitehall-gardens, S.W.*
1891		Wilson, Henry J., M.P., *Osgathorpe Hills, Sheffield.*
1898		Wilson, Herbert W., 203, *Elgin-avenue, W.*
1884		Wilson, The Hon. Sir James, K.C.S.I., *Ochilview, Crieff, N.B.*
1909		Wolfe, Lee J., 161, *Broadway, New York, U.S.A.*
1900	*d*	Wolfe, S. Herbert, 165, *Broadway, New York City, U.S.A.*
1897	*d p*	Wood, George H., *Gwyndy, Netherton, Nr. Huddersfield.*
1897		Woodd, Basil A. H., *Abbotsfield, Wireliscombe, Somerset.*
1902		Woodhouse, Lister, A.C.A., *Westminster City Hall, Charing Cross-rd., W.C.*
1908		Woodward, James H., 137, *Gillott-road, Edgbaston. Birmingham.*
1890		*Woollcombe, Robert L., LL.D., &c., 14, *Waterloo-road, Dublin.*
1903		Woolley, Ernest, 7, *Finch-lane, Cornhill, E.C.*
1895		Worsfold, Edward M., F.C.A., *Market Square Dover.*
1878		Worsfold, Rev. John N., M.A., *Hathelsey,* 17, *Alexandra-road, Worthing.*
1906		Wyldbore-Smith, Edmund C., *The Foreign Office, S.W.*

Year of Election.		
1868	*c d p*	YERBURGH, ROBERT A., M.P., 25, *Kensington Gore, S.W.*
1900		Yerbury, John E., 3, *Queen-street, Cheapside, E C.*
1888		*Yglesias, Miguel, 2, *Tokenhouse-buildings, E.C.*
1877		*Youll, John G., *Jesmond-road, Newcastle-on-Tyne.*
1909		Young, Arthur Stanley, F.I.A., *H.H. The Nizam's Service, Hyderabad, Deccan, India.*
1908		Young, Charles W. F., M.D., *County Medical Officers' Dept., Queen Anne's-chambers*, 30, *Broadway, Westminster, S.W.*
1911		Young, Professor Allyn A., *Washington University, St. Louis, U.S.A.*
1898		Young, Sydney, *The Corn Exchange, Mark-lane, E.C.*
1895	*c d p*	YULE, G. UDNY (*Hon. Secretary*), 28, *Great Ormond-street, W.C.*
1901		Zimmerman, Lawrence W., 282, *Dickenson-road, Rusholme, Manchester*

⁂ *The Honorary Secretaries request that any inaccuracy in the foregoing list, and all changes of address, may be notified to the* ASSISTANT SECRETARY.

HONORARY FELLOWS.

HIS MOST GRACIOUS MAJESTY THE KING,

Patron.

Argentine Republic.

Year of Election

1890 *d* FRANCISCO LATZINA, **Calle Maipu, 982, Buenos Ayres.** Director General of Statistics; Doctor *honoris causâ* of the Faculty of Physical and Mathematical Sciences of the University of Cordoba; Knight of the Austrian Order of the Iron Crown; Knight of the Italian Order of S.S. Maurice and Lazare; Officer of the Academy of France; Member of the National Academy of Sciences, of the International Statistical Institute, of the Geographical and Statistical Societies of Paris, of the Society of Commercial Geography of Paris, and Corresponding Member of the National Historical Academy of Venezuela.

Austria.

1911 DR. ROBERT MEYER, **Vienna.** President of the Imperial and Royal Central Statistical Commission, Vienna.

Belgium.

1904 *d* EMILE WAXWEILER, **Parc Leopold, Brussels.** Director of the Solvay Sociological Institute, Brussels; Professor of Statistics, Economics and Sociology at the University of Brussels; Member of the International Statistical Institute; Member of the Royal Academy of Belgium.

Denmark.

1878 *d* VIGAND ANDREAS FALBE-HANSEN, **Copenhagen.** Late Director of the Statistical Bureau of the State; late Professor of Political Economy at the University of Copenhagen; Director of the Life and Fire Office "Danmark"; *Doctor Juris*; Life Member of the Upper House of Legislation (Landsthing); Knight Commander of the Order of the "Danebrog."

1900 *d p* MARCUS RUBIN, **Vendersgade 25a, Copenhagen.** Knight of the Order of the "Danebrog"; Director-General of Customs and Taxation; late Director of the Statistical Bureau of the State; President of the Danish Society of Political Economy and of the Board of the Danish Society of History; Member of the International Statistical Institute.

Denmark—*Contd.*

Year of Election		
1907	*d p*	HARALD LUDVIG WESTERGAARD, **Scherfigsvej, Copenhagen.** Professor of Political Economy and Statistics at the University of Copenhagen.

France.

Year of Election		
1880	*d p*	JACQUES BERTILLON, M.D., **1, Avenue Victoria, Paris.** Chief of the Statistical Department of the City of Paris; Member of the Superior Council of Statistics; of the Consultative Committee of Public Hygiene of France; Past President of the Statistical Society of Paris; and Member of the International Statistical Institute, &c.
1879	*d*	ARTHUR CHERVIN, M.D., **82, Avenue Victor Hugo, Paris. XVI^{e}.** Doctor of Medicine and Surgery; Director of the Paris Institute for Stammerers; Past President of the Statistical Society of Paris; Member of the Superior Council of Statistics, &c.
1890	*d p*	ALFRED DE FOVILLE, **30, Rue Bellechase, Paris.** Late Master of the Mint; Councillor of the Court of Accounts; Commander of the Legion of Honour; Perpetual Secretary of the Academy of Moral and Political Sciences; Past President of the Statistical Society of Paris; Member of the International Statistical Institute and of the Superior Council of Statistics.
1908	*d p*	YVES GUYOT, **95, Rue de Seine, Paris.** Member of the Superior Council of Statistics; ex-President of the Statistical Society of Paris; ex-Minister of Public Works; Guy Medallist; Hon. Member of the Cobden Club; Vice-President of the Society of Political Economy; Editor of the "Journal des Economistes," &c.
1911	*d*	LUCIEN MARCH, **97, Quai D'Orsay, Paris, France.** Statistique Générale de la France.
1910	*d*	M. EUGÈNE TISSERAND, **17, Rue de Cirque Paris.** Corresponding Member of the Academy of Sciences (Institute of France); ex-Councillor of State; Honorary Director of Agriculture; ex-Member of the Superior Council of Statistics; ex-President of the Statistical Society of Paris.
1887		DANIEL WILSON, **2, Avenue d'Jéna, Paris.** Ex-Under-Secretary of State; Past President of the Statistical Society of Paris.
1876	*d*	THE PRESIDENT (for the time being) OF THE STATISTICAL SOCIETY OF PARIS, **28, Rue Serpente Danton, Paris.**

Year of Election.

Germany.

1890 *d* KARL JULIUS EMIL BLENCK, *DOCTOR*, **Lindenstrasse, 28, Berlin S.W.**
Wirklicher Geheimer Ober-Regierungsrat; President of the Royal Statistical Office of Prussia, also Member of the Prussian Central Statistical Commission and of the Central Board of Control of the Survey of Prussia; Honorary Member of the International Statistical Institute; Honorary Member or Member of several learned Societies.

1896 *d* CARL VICTOR BÖHMERT, **Hospitalstrasse, 4, Dresden.**
Geheimer Regierungsrath; Doctor Juris; Late Director of the Statistical Bureau of Saxony; Professor of Political Economy and Statistics in the Polytechnical High School of Dresden; Member of the International Statistical Institute.

1908 *d* RICHARD VAN DER BORGHT, **Lützow-Ufer 8, Berlin W. 10.**
Dr. *phil.*, President of the Imperial Statistical Office; President of the Council for Labour Statistics; Member of the Prussian Central Statistical Commission; Corresponding Member of the Belgian Central Statistical Commission; Member of the International Statistical Institute; formerly Professor of Political Economy at the Technical High School of Aachen.

1904 *d* DR. WILHELM LEXIS, **Göttingen.**
Professor of Economics and Statistics at the University of Göttingen; Vice-President of the International Statistical Institute.

1877 *d* GEORG VON MAYR, **Georgenstrasse, 38, Munich.**
Ex-Under Secretary of State in the Imperial Ministry for Alsace-Lorraine; formerly Director of the Royal Statistical Bureau of Bavaria; Honorary Member of the International Statistical Institute; Ordinary Professor of Statistics, Finances, and Political Economy at the University of Munich; Associate of the Statistical Society of Paris.

1897 *d* ADOLPH WAGNER, Ph.D., **51, Lessingstrasse, Berlin, N.W.**
Professor of Political Economy at the University of Berlin; Member of the Statistical Bureau of Prussia, and of the International Statistical Institute.

1876 *d* THE PRESIDENT (for the time being) OF THE GEOGRAPHICAL AND STATISTICAL SOCIETY OF FRANKFORT, **Stadtbibliothek, Frankfort.**

Hungary.

1904 *d* JULIUS DE VARGHA, DR. *JURIS.* **Budapest.**
Director of the Central Statistical Office of Hungary; Member of the Hungarian Academy of Sciences and of the "Society Kisfaludy"; President of the Commission for the preparation of the annual administration report on Hungary; Member of the International Statistical Institute, &c.

Year of Election.

Italy.

1874 *d* LUIGI BODIO, **153, Via Torino, Rome.**
Senator; Doctor of Laws; Councillor of State; President of the Council of Statistics of the Kingdom; President of the Council of Emigration; President of the International Statistical Institute; Member of the Royal Academy "dei Lincei"; Correspondent of the Institute of France (Academy of Moral and Political Sciences).

1899 *d* CARLO FRANCESCO FERRARIS, **Via 20 settembre, 7, Padua.**
Professor of Administrative Science and Law at the Royal University of Padua; Member of the Superior Council of Statistics and of the Superior Council of Public Education of Italy; Member of the Academy "dei Lincei," of the Royal Institute of Science at Venice, of the International Statistical Institute, and Honorary Member of the Swiss Statistical Society; ex-Minister of Public Works; Member of the Italian Parliament.

1907 *d* ENRICO RASERI, M.D., **Direzione Generale della Statistica, Rome.**
Chief (*ad interim*) of the Statistical Department of the Kingdom; Member of the "Higher Council of Statistics"; Member of the International Statistical Institute; Member of the Royal Academy of Medicine in Rome.

Japan.

1910 *d* COUNT Y. YANAGISAWA, **1, Shiba Jamachi, 8, Chôme, Tokio.**
Member of the House of Peers; Honorary Member of the Bureau of General Statistics, Imperial Cabinet; Honorary Counsellor of Statistical Department of City of Tokio; Member of National Census Committee; late Professor of Statistics at Waseda University; Member of International Statistical Institute; Honorary Member of Statistical Society of Formosa, &c., &c.

Netherlands.

1904 *d* C. A. VERRIJN STUART, **Professor at the University, Groningen, Holland.**
Professor of Political Economy and Statistics at the University, Groningen; President of the Central Statistical Commission of the Netherlands; Secretary-General of International Statistical Institute; late Director of the Central Statistical Bureau of the Netherlands; Corresponding Member of Statistical Society of Paris; Honorary Member of the Cobden Club.

Norway.

1874 *d* ANDERS NICOLAI KIÆR, **Christiania.**
Director of the Central Statistical Bureau of Norway Associate of the Statistical Society of Paris; Member of the International Statistical Institute.

Year of Election.

Russia.

1873 *d* HIS EXCELLENCY PIERRE SEMENOV, **St. Petersburg.**
Senator; Privy Councillor to His Imperial Majesty; President of the Imperial Statistical Council; President of the Imperial Geographical Society; Honorary Member of the Academy of Sciences in St. Petersburg; Associate of the Statistical Society of Paris.

1890 *d* HIS EXCELLENCY NICOLAS TROÏNITSKY, **Mohovaïa 6, St. Petersburg.**
Former Governor; Senator; Acting Privy Councillor; late Director of the Central Statistical Committee of the Ministry of the Interior; President of the Statistical Council, Life Member of the Imperial Geographical Society of Russia, Vice-President of the International Statistical Institute, and Member of the Statistical Society of Paris.

Sweden.

1890 *d* ELIS SIDENBLADH., Ph.D., **Stockholm.**
Late Director in Chief of the Central Statistical Bureau of Sweden; late President of the Royal Statistical Commission; Commander, Officer, and Knight of several Swedish and Foreign Orders; Member of the Royal Academies of Sciences and of Agriculture, at Stockholm, of the International Statistical Institute, and Honorary and Corresponding Member of several foreign learned Societies.

1909 *d* DR. GUSTAV SUNDBÄRG.
Professor of Statistics at the University of Upsala, Upsala; Compiler of the series "Aperçus statistiques internationaux."

Switzerland.

1890 *d* LOUIS GUILLAUME, **Bern.**
Doctor of Medicine; Director of the Federal Statistical Bureau; Member of the International Statistical Institute.

Turkey.

1911 DJAVID BEY, **Ministry of Finance, Constantinople.**

United States.

1873 *d* THE HON. WILLIAM BARNES, **The O'Conor-Barnes Homestead, On the Cliff, Nantucket Island, Mass., U.S.A.**
Lawyer; ex-Superintendent of the Insurance Department, State of New York.

1881 *d* JOHN SHAW BILLINGS, **425, Lafayette Street, New York City.**
M.A., M.D., LL.D., Edinburgh and Harvard; D.C.L., Oxon; Surgeon, U.S. Army; Member of the National Academy of Sciences, of the International Statistical Institute, &c.

United States—*Contd.*

Year of Election.		
1896	*d*	WORTHINGTON CHAUNCEY FORD, c/o **Massachusetts Historical Society, Boston, Mass., U.S.A.** Late Chief of the Bureau of Statistics, Treasury Department; late Chief of the Bureau of Statistics, Department of State; Member of the International Statistical Institute.
1877	*d*	EDWARD YOUNG, M.A., Ph.D., **207, Maryland Avenue, N.E., Washington, D.C.** Late Consul of the United States; formerly Chief of the Bureau of Statistics, United States of America; Member of the Geographical Society of Paris.
1911	*d*	THE PRESIDENT (for the time being) OF THE AMERICAN STATISTICAL ASSOCIATION, **Boston.**

Tasmania.

Year of Election.		
1894	*d*	ROBERT MACKENZIE JOHNSTON, I.S.O., **Hobart.** Registrar-General and Government Statistician; Fellow and Member of Council of the Royal Society of Tasmania; Member of Council and of Senate of the University of Tasmania; Fellow and Past President of Section F (*Economics* and *Statistics*) of the Australasian Association for the Advancement of Science; Fellow of the Royal Geographical Society of Australia; Honorary Foreign Corresponding Member of the Geological Society of Edinburgh; Fellow of the Linnean Society of London.
1876	*d p*	EDWIN CRADOCK NOWELL, I.S.O., J.P., **Hobart.** Clerk of Legislative Council of Tasmania; late Government Statistician; Clerk to the Federal Council of Australasia in its seven Sessions.

Great Britain and Ireland.

Year of Election.		
1876	*d*	THE PRESIDENT (for the time being) OF THE MANCHESTER STATISTICAL SOCIETY, **3, York Street, Manchester.**
1876	*d*	THE PRESIDENT (for the time being) OF THE STATISTICAL AND SOCIAL INQUIRY SOCIETY OF IRELAND, **35, Molesworth Street, Dublin.**

⁂ The Honorary Secretaries request that any inaccuracies in the List of HONORARY FELLOWS, and all changes of address, may be notified to the Assistant Secretary.

ROYAL STATISTICAL SOCIETY.

Copy of Charter.

Victoria, by the Grace of God of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith.

To all to whom these Presents shall come, Greeting:—

Whereas Our Right trusty and entirely beloved cousin, Henry, Third Marquess of Lansdowne, Knight of the Most Noble Order of the Garter, Charles Babbage, Fellow of the Royal Society, John Elliott Drinkwater, Master of Arts, Henry Hallam, Fellow of the Royal Society, the Reverend Richard Jones, Master of Arts, and others of Our loving subjects, did, in the year One thousand eight hundred and thirty-four, establish a Society to collect, arrange, digest and publish facts, illustrating the condition and prospects of society in its material, social, and moral relations; these facts being for the most part arranged in tabular forms and in accordance with the principles of the numerical method, and the same Society is now called or known by the name of "The "Statistical Society."

And Whereas it has been represented to Us that the same Society has, since its establishment, sedulously pursued such its proposed objects, and by its publications (including those of its transactions), and by promoting the discussion of legislative and other public measures from the statistical point of view, has greatly contributed to the progress of statistical and economical science.

And Whereas distinguished individuals in foreign countries, as well as many eminent British subjects, have availed themselves of the facilities offered by the same Society for communicating important information largely extending statistical knowledge; and the general interest now felt in Statistics has been greatly promoted and fostered by this Society.

And Whereas the same Society has, in aid of its objects, collected a large and valuable library of scientific works and charts, to which fresh accessions are constantly made; and the said Society has hitherto been supported by annual and other subscriptions and contributions to its funds, and has lately acquired leasehold premises in which the business of the said Society is carried on.

And Whereas in order to secure the property of the said Society, to extend its operations, and to give it its due position among the Scientific Institutions of Our kingdom, We have been besought to grant to Sir Rawson William Rawson, Knight Commander of the Most Distinguished Order of St. Michael and St. George, and Companion of the Most Honourable Order of the Bath, and to those who now are Members of the said Society, or who shall from time to time be elected Fellows of the Royal Statistical Society hereby incorporated, Our Royal Charter of Incorporation for the purposes aforesaid.

1. **Now Know Ye** that We, being desirous of encouraging a design so laudable and salutary, of Our especial grace, certain knowledge and mere motion, have willed, granted, and declared and Do by these Presents, for Us, Our heirs and successors, will, grant, and declare that the said Sir Rawson William Rawson, Knight Commander of the Most Distinguished Order of St. Michael and St. George, and Companion of the Most Honourable Order of the Bath, and such other of Our loving subjects as now are Members of the said Society, or shall from time to time be elected Fellows of "The Royal Statistical Society" hereby incorporated according to such regulations or bye laws as shall be hereafter framed or enacted, and their successors, shall for ever hereafter be by virtue of these presents one body politic and corporate, by the name of "**The Royal Statistical Society**," and for the purposes aforesaid, and by the name aforesaid, shall have perpetual succession and a common seal, with full power and authority to alter, vary, break, and renew the same at their discretion, and by the same name to sue and be sued, implead and be impleaded, answer and be answered, unto and in every Court of Us, Our heirs and successors.

2. **The** Royal Statistical Society, in this Charter hereinafter called "The Society," may, notwithstanding the statutes of mortmain, take, purchase, hold and enjoy to them and their successors a hall, or house, and any such messuages or hereditaments of any tenure as may be necessary, for carrying out the purposes of the Society, but so that the yearly value thereof to be computed at the rack rent which might be gotten for the same at the time of the purchase or other acquisition, and including the site of the said hall, or house, do not exceed in the whole the sum of Two thousand pounds.

3. **There** shall be a Council of the Society, and the said Council and General Meetings of the Fellows to be held in accordance with this Our Charter shall, subject to the provisions of this Our Charter, have entire the management and direction of the concerns of the Society.

4. **There** shall be a President, Vice-Presidents, a Treasurer or Treasurers, and a Secretary or Secretaries of the Society. The Council shall consist of the President, Vice-Presidents, and not

less than twenty Councillors; and the Treasurer or Treasurers and the Secretary or Secretaries if honorary.

5. **The** several persons who were elected to be the President, Vice-Presidents, and Members of the Council of the Statistical Society at the Annual Meeting held in the month of June, One thousand eight hundred and eighty-six, shall form the first Council of the Society, and shall continue in office until the first Election of officers is made under these presents as hereinafter provided.

6. **General** Meetings of the Fellows of the Society may be held from time to time, and at least one General Meeting shall be held in each year. Every General Meeting may be adjourned, subject to the provisions of the Bye Laws. The following business may be transacted by a General Meeting, viz.:—

(*a.*) The Election of the President, Vice-Presidents, Treasurer or Treasurers, Secretary or Secretaries, and other Members of the Council of the Society.
(*b.*) The making, repeal, or amendment of Bye Laws.
(*c.*) The passing of any proper resolution respecting the affairs of the Society.

7. **Bye Laws** of the Society may be made for the following purposes, and subject to the following conditions, viz.:—

(*a.*) For prescribing the qualification and condition of tenure of office of the President; the number, qualifications, functions, and conditions of tenure of office of the Vice-Presidents, Treasurers, Secretaries, and Members of Council, and Officers of the Society; for making regulations with respect to General Meetings and Meetings of the Council and proceedings thereat, and for the election of any persons to be Honorary Fellows or Associates of the Society, and defining their privileges (but such persons, if elected, shall not be Members of the Corporation), and for making regulations respecting the making, repeal and amendment of Bye Laws, and generally for the government of the Society and the management of its property and affairs.
(*b.*) The first Bye Laws shall be made at the first General Meeting to be held under these presents, and shall (amongst other things) prescribe the time for holding the first election of officers under these presents.

8. **The** General Meetings and adjourned General Meetings of the Society shall take place (subject to the rules or bye laws of the Society, and to any power of convening or demanding a

Special General Meeting thereby given) at such times and places as may be fixed by the Council.

9. **The** existing rules of the Statistical Society, so far as not inconsistent with these presents, shall be in force as the Bye Laws of the Society until the first Bye Laws to be made under these presents shall come into operation.

10. **Subject** to these presents and the Bye Laws of the Society for the time being, the Council shall have the sole management of the income, funds, and property of the Society, and may manage and superintend all other affairs of the Society, and appoint and dismiss at their pleasure all salaried and other officers, attendants, and servants as they may think fit, and may do all such things as shall appear to them necessary or expedient for giving effect to the objects of the Society.

11. **The** Council shall once in every year present to a General Meeting a report of the proceedings of the Society, together with a statement of the receipts and expenditure, and of the financial position of the Society, and every Fellow of the Society may, at reasonable times to be fixed by the Council, examine the accounts of the Society.

12. **The** Council may, with the approval of a General Meeting, from time to time appoint fit persons to be Trustees of any part of the real or personal property of the Society, and may make or direct any transfer of such property so placed in trust necessary for the purposes of the trust, or may, at their discretion, take in the corporate name of the Society conveyances or transfers of any property capable of being held in that name. Provided that no sale, mortgage, incumbrance, or other disposition of any hereditaments belonging to the Society shall be made unless with the approval of a General Meeting.

13. **No** Rule, Bye Law, Resolution, or other proceeding shall be made or had by the Society, or any meeting thereof, or by the Council, contrary to the general scope or true intent and meaning of this Our Charter, or the laws or statutes of Our Realm, and anything done contrary to this present clause shall be void.

In Witness whereof We have caused these Our Letters to be made Patent.

Witness Ourself, at Westminster, the thirty-first day of January, in the fiftieth year of Our Reign.

By Warrant under the Queen's Sign Manual,

(L. S.)

Muir Mackenzie.

ROYAL STATISTICAL SOCIETY.

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BYE-LAWS OF THE ROYAL STATISTICAL SOCIETY.

Objects of the Society.

1. The objects of the Royal Statistical Society are to collect, arrange, digest and publish facts, illustrating the condition and prospects of society in its material, social and moral relations; these facts being for the most part arranged in tabular forms and in accordance with the principles of the numerical method.

The Society collects new materials, condenses, arranges, and publishes those already existing, whether unpublished or published in diffuse and expensive forms in the English or in any foreign language, and promotes the discussion of legislative and other public measures from the statistical point of view. These discussions form portions of the published Transactions of the Society.

Constitution of the Society.

2. The Society consists of Fellows and Honorary Fellows, elected in the manner hereinafter described.

Number of Fellows and Honorary Fellows.

3. The number of Fellows is unlimited. Foreigners or British subjects of distinction residing out of the United Kingdom may be admitted as Honorary Fellows, of whom the number shall not be more than seventy at any one time.

Proposal of Fellows.

4. Every Candidate for admission as a Fellow of the Society shall be proposed by two or more Fellows, who shall certify from their personal knowledge of him or of his works, that he is a fit person to be admitted a Fellow of the Society. Every such certificate having been read and approved of at a Meeting of the Council, shall be suspended in the office of the Society until the following Ordinary Meeting, at which the vote shall be taken.

Election of Fellows.

5. In the election of Fellows, the votes shall be taken by ballot. No person shall be admitted unless at least sixteen Fellows vote. and unless he have in his favour three-fourths of the Fellows voting.

Admission of Fellows.

6. Every Fellow elect is required to take the earliest opportunity of presenting himself for admission at an Ordinary Meeting of the Society.

The manner of admission shall be thus:—

Immediately after the reading of the minutes, the Fellow elect, having first paid his subscription for the current year or his composition, shall sign the obligation contained in the Fellowship-book, to the effect following:—

"We, who have underwritten our "names, do hereby undertake, each for "himself, that we will endeavour to "further the good of the Royal Statis-"tical Society for improving Statistical "Knowledge, and the ends for which "the same has been founded; that we "will be present at the Meetings of the "Society as often as conveniently we "can, and that we will keep and fulfil "the Bye-laws and Orders of this "Society: provided that whensoever "any one of us shall make known, by "writing under his hand, to the Secre-"taries for the time being, that he "desires to withdraw from the Society, "he shall be free thenceforward from "this obligation."

Whereon the President, taking him by the hand, shall say,—"By the "authority, and in the name of the "Royal Statistical Society, I do admit "you a Fellow thereof."

Upon their admission Fellows shall have the right of attaching to their names the letters F.S.S., but not in connection with any trading or business advertisement other than the publication of any book or literary notice.

Admission of Honorary Fellows.

7. There shall be Two Meetings of the Society in the year, on such days as shall be hereafter fixed by the Council, at which Honorary Fellows may be elected.

No Honorary Fellow can be recommended for election but by the Council. At any Meeting of the Council any Member thereof may propose a Foreigner or British subject of distinction residing out of the United Kingdom, delivering at the same time a written statement of the qualifications of, offices held by, and published works of, the person proposed; and ten days' notice at least shall be given to every Member of the Council, of the day on which the Council will vote by ballot on the question whether they will recommend to the Society the election of the person proposed. No such recommendation to the Society shall be adopted unless at least three-fourths of the votes are in favour thereof.

Notice of the recommendation shall be given from the chair at the Meeting of the Society next preceding that at which the vote shall be taken thereon. No person shall be elected an Honorary Fellow unless sixteen Fellows vote and three-fourths of the Fellows voting be in his favour.

The Council shall have power to elect as Honorary Fellows, the Presidents for the time being of the Statistical Societies of Dublin, Manchester, and Paris, and the President of any other Statistical Society at home or abroad.

Payments by Fellows.

8. Every Fellow of the Society shall pay a yearly subscription of Two Guineas, or may at any time compound for his future yearly payments by paying at once the sum of Twenty Guineas,* or after the payment of twenty-five annual subscriptions the sum of Ten Guineas, unless the Annual Subscription or Composition Fee shall be remitted by the Council; provided that the number of Fellows whose Annual Subscription or Composition Fee shall have been thus remitted, do not exceed five at any one time.

Every person elected to the Society shall pay his first subscription (or if he desire to become a Life Fellow, his composition) within three months, at the latest, of the date of his election, if he be resident in the United Kingdom. If he be resident abroad, this period shall be six months. If payment be not made within the time specified above, the election shall be void.

Defaulters.—Withdrawal of Fellows.

9. All yearly payments are due in advance on the 1st of January, and if any Fellow of the Society have not paid his subscription before the 1st of July, he shall be applied to in writing by the Secretaries, and if the same be not paid before the 1st of January of the second year, a written application shall again be made by the Secretaries, and the Fellow in arrear shall cease to receive the Society's publications, and shall not be entitled to any of the privileges of the Society until such arrears are paid; and if the subscription be not discharged before the 1st of February of the second year, the name of the Fellow thus in arrear shall be exhibited on a card suspended in the office of the Society; and if, at the next Annual General Meeting, the amount still remain unpaid, the defaulter shall, unless otherwise authorised by the Council, be announced to be no longer a Fellow of the Society, the reason for the same being at the same time assigned. No Fellow of the Society can withdraw his name from the Society's books, unless all arrears be paid; and no resignation will be deemed valid unless a written notice thereof be communicated to the Secretaries. No Fellow shall be entitled to vote at any Meeting of the Society until he shall have paid his subscription for the current year.

Expulsion of Fellows.

10. If any Fellow of the Society, or any Honorary Fellow, shall so demean himself that it would be for the dishonour of the Society that he longer continue to be a Fellow or Honorary Fellow thereof, the Council shall take the matter into consideration; and if the majority of the Members of the Council present at some Meeting (of which and of the matter in hand such Fellow or Honorary Fellow, and every Member of the Council, shall have due notice) shall decide by ballot to recommend that such Fellow or Honorary Fellow be expelled from the Society, the President shall at its next Ordinary Meeting announce to the Society the recommendation of the Council, and at the following Meeting the question shall be decided by ballot, and if at least three-fourths of the

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* Cheques should be made payable to "The Royal Statistical Society," and crossed "Messrs. "Drummond and Co."

number voting are in favour of the expulsion, the President shall forthwith cancel the name in the Fellowship-book, and shall say,—

"By the authority and in the name "of the Royal Statistical Society, I do "declare that A. B. (naming him) is no "longer a Fellow (or Honorary Fellow) "thereof."

And such Fellow or Honorary Fellow shall thereupon cease to be of the Society.

Trustees.

11. The property of the Society may be vested in three Trustees, chosen by the Fellows. The Trustees are eligible to any other offices in the Society.

President, Council, and Officers.

12. The Council shall consist of a President and thirty Members, together with the Honorary Vice-Presidents.

From the Council shall be chosen four Vice-Presidents, a Treasurer, the Honorary Secretaries, and a Foreign Secretary, who may be one of the Honorary Secretaries. The former Presidents who are continuing Fellows of the Society shall be Honorary Vice-Presidents. Any five of the Council shall be a quorum.

Election of President and Officers.

13. The President, Members of Council, Treasurer, and Honorary and Foreign Secretaries shall be chosen annually by the Fellows at the Annual General Meeting.

The Vice-Presidents shall be chosen annually from the Council by the President.

The President shall not be eligible for the office more than two years in succession.

Six Fellows, at least, who were not of the Council of the previous year, shall be annually elected; and of the Members retiring three at least shall be those who have served longest continuously on the Council, unless they hold office as Treasurer or Honorary or Foreign Secretary.

Nomination of President, Council, and Officers.

14. The Council shall, previously to the Annual General Meeting, nominate, by ballot, the Fellows whom they recommend to be the next President and Council of the Society. They shall also recommend for election a Treasurer and the Secretaries (in accordance with Rule 12). Notice shall be sent to every Fellow whose residence is known to be within the limits of the metropolitan post, at least a fortnight before the Annual General Meeting, of the names of Fellows recommended by the Council.

Extraordinary Vacancies.

15. On any extraordinary vacancy occurring of the Office of President, or other Officer of the Society, the Honorary Secretaries shall summon the Council with as little delay as possible, and a majority of the Council, thereupon meeting in their usual place, shall, by ballot, and by a majority of those present, choose a new President, or other Officer of the Society, to be so until the next Annual General Meeting.

Committees.

16. The Council shall have power to appoint Committees of Fellows and also an Executive Committee of their own body. The Committees shall report their proceedings to the Council. No report shall be communicated to the Society except by the Council.

Auditors.

17. At the first Ordinary Meeting of each year, the Fellows shall choose two Fellows, not being Members of the Council, as Auditors, who, with one of the Council, chosen by the Council, shall audit the Treasurer's accounts for the past year, and report thereon to the Society, which report shall be presented at the Ordinary Meeting in February. The Auditors shall be empowered to examine into the particulars of all expenditure of the funds of the Society, and may report their opinion upon any part of it.

Meetings Ordinary and General.

18. The Ordinary Meetings of the Society shall be held monthly, or oftener, during the Session, which shall be from the 1st of November to the 1st of July in each year, both inclusive, on such days and at such hours as the Council shall declare. The Annual General Meeting shall be held on such day in the month of June of each year as shall be appointed by the Council for the time being.

Business of Ordinary Meetings.

19. The business of the Ordinary Meetings shall be to elect and admit Fellows, to read and hear reports, letters, and papers on subjects interesting to the Society. Nothing relating to the bye-laws or management of the Society shall be discussed at the Ordinary Meetings, except that the Auditors' Report shall be presented at the Ordinary Meeting in February, and that the Minutes of the Annual General Meeting, and of every Special General Meeting, shall be submitted for confirmation at the next Ordinary Meeting after the day of such Annual or Special General Meeting. Strangers may be introduced to the Ordinary Meetings, by any Fellow, with the leave of the President, Vice-President, or other Fellow presiding at the Meeting.

Business of Annual General Meeting.

20. The business of the Annual General Meeting shall be to elect the Officers of the Society, and to discuss questions on its bye-laws and management. No Fellow or Honorary Fellow shall be proposed at the Annual General Meeting. No Fellow shall propose any alteration of the rules or bye-laws of the Society at the Annual General Meeting, unless after three weeks' notice thereof given in writing to the Council, but amendments to any motion may be brought forward without notice, so that they relate to the same subject as the motion. The Council shall give fourteen days' notice to every Fellow of all questions of which such notice shall have been given to them.

Special General Meetings.

21. The Council may, at any time, call a Special General Meeting of the Society when it appears to them necessary. Any twenty Fellows may require a Special General Meeting to be called, by notice in writing signed by them, delivered to one of the Secretaries, specifying the questions to be moved. The Council shall, within one week of such notice, appoint a day for such Special General Meeting, and shall give at least one week's notice of every Special General Meeting, and of the questions to be moved, to every Fellow within the limits of the metropolitan post, whose residence is known. No business shall be brought forward at any Special General Meeting other than that specified in the notice convening the same.

Duties of the President.

22. The President shall preside at all Meetings of the Society, Council, and Committees which he shall attend, and in case of an equality of votes, shall have a second or casting vote. He shall sign all diplomas of admission of Honorary Fellows. He shall admit and expel Fellows and Honorary Fellows, according to the bye-laws of the Society.

Duties of the Treasurer.

23. The Treasurer shall receive all moneys due to, and pay all moneys owing by, the Society, and shall keep an account of his receipts and payments. No sum exceeding Ten Pounds shall be paid but by order of the Council, excepting always any lawful demand for rates or taxes. The Treasurer shall invest the moneys of the Society in such manner as the Council shall from time to time direct.

Duties of the Honorary Secretaries.

24. The Honorary Secretaries shall, under the control of the Council, conduct the correspondence of the Society; they or one of them shall attend all Meetings of the Society and Council, and shall duly record the Minutes of the Proceedings. They shall issue the requisite notices, and read such papers to the Society as the Council may direct.

Powers of the Vice-Presidents.

25. A Vice-President, whether Honorary or nominated, in the chair, shall act with the power of the President in presiding and voting at any Meeting of the Society or Council, and in admitting Fellows; but no Vice-President shall be empowered to sign diplomas of admission of Honorary Fellows, or to expel Fellows or Honorary Fellows. In the absence of the President and Vice-Presidents, any Member of Council may be called upon by the Fellows then present, to preside at an Ordinary or Council Meeting, with the same power as a Vice-President.

Powers of the Council.

26. The Council shall have control over the papers and funds of the Society, and may, as they shall see fit, direct the publication of papers and the expenditure of the funds, in accordance with the provisions of the Charter.

27. The Council shall be empowered at any time to frame Regulations not inconsistent with these bye-laws, which shall be and remain in force until the next Annual General Meeting, at which they shall be either affirmed or annulled; but no Council shall have power to renew Regulations which have once been disapproved at an Annual General Meeting.

28. The Council shall have the custody of the Common Seal. The Common Seal shall not be affixed to any instrument, deed, or other document, except by order of the Council and in the presence of at least two Members of the Council and in accordance with such other regulations as the Council shall from time to time prescribe. The fact of the seal having been so affixed shall be entered on the minutes of the Council.

29. No Dividend, Gift, Division, of Bonus in money shall be made by the Society, unto or between any of the Fellows or Members, except as hereinafter provided.

30. The Council shall publish a Journal of the Transactions of the Society, and such other Statistical Publications as they may determine upon, and may from time to time pay such sums to Editors and their assistants, whether Fellows of the Society or not, as may be deemed advisable.

31. All communications to the Society are the property of the Society, unless the Council allow the right of property to be specially reserved by the Contributors.

REGULATIONS OF THE LIBRARY.

1. The Library and the Reading Room are open daily from 10 a.m. to 7 p.m. during the Session, and in other months from 10 a.m. to 5 p.m., except on Saturdays, when they are closed at 2 p.m.

2. Every Fellow, whose subscription is not in arrear, is entitled to consult books and to use the Reading Room. Persons who are non-Fellows may be allowed to use the Library and Reading Room for a definite period on presentation to the Librarian of an introduction by a Member of Council. All cases in which temporary permission has been granted to non-Fellows shall be reported to the Library Committee at its next meeting. No books may be borrowed except by Fellows.

3. Fellows resident in the United Kingdom may borrow books from the Library on personal application, or by letter addressed to the Assistant Secretary or Librarian, all expenses for carriage being paid by them.

4. No Fellow may have more than ten volumes out at any one time or keep any book longer than one month, except by special authority from the Chairman of the Library Committee or an Honorary Secretary.

5. Cyclopædias, books of reference, and unbound scientific journals and periodicals may be borrowed only on the written order of an Honorary Secretary for a period not exceeding *four days.* If books so lent be not returned within the specified time, the borrower shall incur a fine of one shilling per day per volume for each day they are detained beyond the time specified.

6. Any Fellow who damages or loses a book, shall either replace the work or pay a fine equivalent to its value.

7. Readers are not themselves to replace books taken from the shelves, but to lay them on the Library table.

8 Any infringement of these regulations will involve the suspension of the right to the use of the Library, and shall be reported to the Library Committee at its next meeting.

DONORS TO THE LIBRARY.

During the Year 1910-11.

(a) **Foreign Countries.**

Argentine Republic—
Banco Español del Rio de la Plata.
Consul-General.
His Excellency The Argentine Minister.
General Statistical Bureau.
Ministry of Agriculture.
Buenos Ayres. Provincial and Municipal Statistical Bureaus.
Cordoba. Provincial Statistical Bureau.

Austria—
Central Statistical Commission.
Ministry of Agriculture.
„ Finance.
„ Public Works.
„ Railways.
Statistical Department of the Ministry of Commerce.
Austrian Labour Department.
Bohemia. Statistical Bureau.
Bosnia and Herzegovina. Statistical Bureau.

Vienna—
Medical Officer of Health.
Statistical Bureau.
Brünn. Statistical Bureau.
Cracow. Statistical Bureau.
Prague. Statistical Bureau.

Belgium—
Administration of Mines.
Army Medical Department.
Bureau of General Statistics.
Labour Department.
Ministry of Agriculture.
Bruges. The Burgomaster.
Brussels. Bureau of Hygiene.

Belgium—Contd.
Hasselt. The Burgomaster.
Royal Academy of Sciences.
Institute of Sociology.
Le "Monde," The Editor.

Brazil—
Statistical Bureau.
"Brazilian Review," The Editor.

Bulgaria. Statistical Bureau.

Chile—
The Central Statistical Bureau.

China. Imperial Maritime Customs.

Cuba—
"Secretaria de Hacienda."
National Library of Cuba.
Chamber of Commerce.

Denmark—
State Statistical Bureau.
Copenhagen. Statistical Bureau.
Political Economy Society.

Egypt—
Department of Public Health.
Director-General of Customs.
„ Post Office.
Statistical Department, Ministry of Finance.
Comité de Conservation des Monuments de l'Art Arabe.
L'Egypte Contemporaine. The Editor.
Public Debt Office.

France—
Director-General of Customs.
Director of the Mint.
Labour Department.

During the Year 1910-11—*Contd.*

(a) **Foreign Countries**—*Contd.*

France—Contd.
  Colonial Office.
  Ministry of Agriculture.
    ,, Finance.
    ,, Justice.
    ,, Public Works.

  Paris—
    The British Chamber of Commerce.
    Statistical Bureau.
  Economiste Français, The Editor.
  Journal des Economistes, The Editor.
  Monde Economique, The Editor.
  Polybiblion, Revue Bibliographique Universelle, The Editor.
  Réforme Sociale, The Editor.
  Rentier, Le, The Editor.
  Revue d'Economie Politique, The Editor.
  Revue de Statistique, The Publisher.
  The Bank of France.
  Statistical Society of Paris.

Germany—
  Imperial Health Bureau.
    ,, Insurance Bureau.
    ,, Judicial Bureau.
    ,, Statistical Bureau.
  German Consul-General, London.
  German Labour Department.
  Prussia. Royal Statistical Bureau.
  Saxony. Royal Statistical Bureau.
  Alsace-Lorraine. Statistical Bureau.
  Bavaria. Statistical Bureau.
  Berlin. Statistical Bureau.
  Dusseldorf. Statistical Bureau.
  Frankfurt—
    Chamber of Commerce.
    "Soziales Museum."
    Statistical Bureau.
  Hamburg. Statistical Bureau.

Germany—Contd.
  Mannheim. Rheinische Credit Bank.
  Munich. Statistical Bureau.
  Wiesbaden. Statistical Bureau.
  "Allgemeinen Deutschen Muhlen-Zeitung," The Publisher.
  Allgemeines Statistisches Archiv, The Editor.
  Archiv für Rassen- und Gesellschafts-Biologie, The Editor.
  Archiv für Soziale-wissenschaft und Sozialpolitik, &c., The Editor.
  Deutsches Statistisches Zentralblatt, The Editor.
  Jahrbuch für Gesetzgebung, &c., The Editor.
  Jahrbücher für Nationalökonomie und Statistik, The Editor.
  Zeitschrift für die gesamte Staatswissenschaft, The Editor.
  Zeitschrift für Socialwissenschaft, The Editor.
  Geographical and Statistical Society of Frankfurt.
  Verein für Versicherungs-Wissenschaft.

Greece—
  The Ministry of Finance.
  Statistical Bureau.

Honduras. The Economical Review, The Publisher.

Hungary—
  Central Statistical Office.
  Ministry of Agriculture.
  Royal Hungarian Office of Workmen's Insurance.
  Budapest. Statistical Bureau.

Italy—
  Director-General of Agriculture.
    ,, Customs.
    ,, Public Health.

During the Year 1910–11—*Contd.*

(a) **Foreign Countries**—*Contd.*

Italy—Contd.
Director-General of Statistics.
Labour Department.
Ministry of Finance.
„ Justice.
R. Istituto di Scienze Sociali "Cesare Alfieri" in Firenze.
Cagliari. The University.
Turin. Statistical Bureau.
Economista, The Editor.
Giornale degli Economisti, The Editor.
Riforma Sociale, The Editor.
Rivista Italiana di Sociologia, The Editor.
Società Umanitaria.

Japan—
Consul-General, London.
Bureau of General Statistics.
Department of Agriculture and Commerce.
Department of Finance.
Japanese Financial Commission.
Tokyo. Statistical Society.
Liberal News Agency, Tokyo.

Mexico. Statistical Bureau.

Netherlands—
Central Health Bureau.
„ Statistical Bureau.
Ministry of Agriculture, &c.
„ Finance.
„ Interior.
Director-General of Customs.

Norway—
Bureau of State Insurance.
Central Statistical Bureau.

Christiania—
Health Department.
Statistical Bureau.

Paraguay. Statistical Bureau.

Portugal. General Statistical Bureau.

Roumania—
Ministry of Agriculture.
„ Finance.
„ Industry and Commerce.
Bucharest. Statistical Bureau.

Russia—
Central Statistical Commission.
Customs Statistical Bureau.
Imperial Russian Financial Agency.
Ministry of Agriculture.
„ Finance.
Finland—
Statistical Bureau.
St. Petersburg. Statistical Bureau.
Moscow. Statistical Bureau.
Kazan. The University.

Salvador. Statistical Bureau.

Servia. Statistical Bureau.

Spain—
Director-General of Customs.
Geographical and Statistical Institute.
Madrid. Statistical Bureau.

Sweden—
Central Statistical Bureau.
Committee on Official Statistics.
Labour Department.

Stockholm—
Health Department.
Statistical Bureau.
Upsala. Royal University.

Switzerland—
Federal Assurance Bureau.
„ Statistical Bureau.

During the Year 1910–11—*Contd.*

(a) **Foreign Countries**—*Contd.*

Switzerland—Contd.
Federal Department of Customs.
Régie fédérale des Alcools.
Statistical Society of Switzerland.
Swiss Union of Commerce and Industry.

United States—
Bureau of Census.
,, Corporations.
,, Education.
,, Immigration.
,, Manufactures.
,, the Mint.
,, Navigation.
Carnegie Foundation.
Comptroller of the Currency.
Department of Agriculture.
,, Commerce and Labour.
Director of Geological Survey.
Interstate Commerce Commission.
Librarian of Congress.
Naval Observatory.
National Monetary Commission.
Secretary of the Treasury.
California—
Bureau of Labor Statistics.
State Board of Health.
University of California.
Connecticut—
State Board of Health.
Bureau of Labor Statistics.
Illinois—
Bureau of Labor Statistics.
Indiana. Department of Statistics.
Iowa. Bureau of Labor Statistics.
Kansas. Bureau of Labor Statistics.
Maine. Bureau of Labor and Industrial Statistics.

United States—Contd.
Maryland. Bureau of Statistics and Information.
Massachusetts—
Board of Arbitration.
,, Health, Lunacy, &c.
Bureau of Labor Statistics.
State Library.
Michigan—
Bureau of Labor Statistics.
Division of Vital Statistics.
Minnesota. Bureau of Labor Statistics.
Missouri. Bureau of Labor Statistics.
Nebraska. State Bureau of Statistics.
New Hampshire—
Bureau of Labor Statistics.
The State Library.
New Jersey. Bureau of Labor Statistics.
New York. State Library.
,, Department of Labor.
,, State University.
North Carolina. Bureau of Labor Statistics.
Ohio. Bureau of Labor Statistics.
Pennsylvania. Bureau of Industrial Statistics.
Wisconsin—
Bureau of Labor Statistics.
State Board of Health.
Boston—
Metropolitan Water and Sewerage Board.
Statistical Bureau.
Chicago—
University of Chicago Press.
New York City. Public Library.
Bankers' Magazine, The Editor.
Bradstreet's Journal, The Editor.
Commercial and Financial Chronicle, The Editor.

During the Year 1910–11—*Contd.*

(a) **Foreign Countries**—*Contd.*

United States—Contd.

Commercial America, The Editor.
Journal of Political Economy, The Editor.
Political Science Quarterly, The Editor.
Quarterly Journal of Economics, The Editor.
Yale Review, The Editor.
Actuarial Society of America.
American Academy of Political and Social Science.
American Economic Review.
American Geographical Society.
American Philosophical Society.
American Statistical Association.
Columbia University, New York.

United States—Contd.

Commercial Museum, Philadelphia.
John Crerar Library, Chicago.
Johns Hopkins University.
Smithsonian Institution.

Uruguay—

Statistical Bureau.
Montevideo. Statistical Bureau.

Venezuela. Statistical Bureau.

International—

International Agricultural Institute.
International Congress of Master Cotton Spinners.
International Statistical Institute.

(b) **India, and Colonial Possessions.**

India, British—

Secretary of State in Council.
Chief Inspector of Mines.
Director-General of Commercial Intelligence.
Geological Survey.
Lieutenant-Governor of Bengal.
Bengal, The Collector of Customs.
Calcutta. Custom House.
Sanitary Commission for Punjab.
East India Railway Co.
Indian Engineering, The Editor.

Australia, Commonwealth of—

The Commonwealth Statistician.
Officer representing the Commonwealth, London.

Canada—

The Auditor-General.
Census and Statistics Office.
Clerk of House of Commons.
Commissioner of Customs.
Minister of Labour.

Canada—Contd.

Department of Agriculture.
Finance Department.
Alberta. The Provincial Government.
British Columbia. Department of Mines.
Ontario—
  Bureau of Industries.
  Department of Agriculture.
Manitoba—
  The King's Printer.
  Department of Works.
Saskatchewan. Department of Agriculture.
Royal Society of Canada.
Royal Bank of Canada.

Cape of Good Hope—

Agent-General for the Cape.
Colonial Secretary.

Ceylon—

Ceylon Government.

During the Year 1910-11—*Contd.*

(b) **India and Colonial Possessions**—*Contd.*

Ceylon—Contd.
General Manager of Government Railways.
Registrar-General.

Jamaica. Registrar-General

Mauritius. The Colonial Secretary.

Natal—
Agent-General, London.
The Colonial Secretary.
Commercial Agent (London).

New South Wales—
Bureau of Statistics.
Agent-General, London.
Chief Accountant, Railway Department.
Controller-General of Prisons.
Government Statistician.
Registrar of Friendly Societies.
Railway Commissioners, Sydney.

New Zealand—
Registrar-General.
Registrar of Friendly Societies.
Insurance Department.
Old Age Pension Department.
Labour Department.
Dept. of Lands and Survey.
New Zealand Institute.
Trade Review, The Editor.
Wellington. Harbour Board.

Queensland—
Agent-General, London.
The Government Statistician.

Rhodesia—
British South Africa Company.
Chamber of Mines.

South Africa—
South African Customs Statistical Bureau.

South Africa—Contd.
Statistical Soc. of South Africa.

South Australia—
The Chief Secretary.
Government Statist.
Public Actuary.
Public Library.
Registrar-General.

Straits Settlements. The Government Secretary, Perak.

Tasmania—
Government Railways Department.
Government Statistician.
Royal Society of Tasmania.

Transvaal—
Agricultural Department.
Department of Mines.
Government Mining Engineer.
Johannesburg—
Chamber of Mines.
Chamber of Commerce.
Pretoria. Chamber of Commerce.

Victoria—
Agent-General, London.
Government Statistician.
Registrar for Friendly Societies.
Public Library, &c., Melbourne.

Western Australia—
Agent-General, London.
The Government Actuary.
Department of Mines.
Registrar of Friendly Societies.
Registrar-General and Government Statistician.

During the Year 1910–11—*Contd.*

(c) United Kingdom and its several Divisions.

United Kingdom—

Admiralty Medical Department.
Army Medical Department.
Army Veterinary Service, The Director-General.
Board of Agriculture and Fisheries.
Board of Trade.
British Museum.
Chancellor of the Exchequer.
Census of Production Office, The Director.
Colonial Office.
Companies in Liquidation, Inspector-General.
Customs, Commissioners.
Ecclesiastical Commissioners.
Factories and Workshops, Chief Inspector.
Foreign Office.
Friendly Societies, Chief Registrar.
Home Office.
India Office.
Inland Revenue, The Commissioners.
Inspector-General in Bankruptcy.
Joint Stock Companies, The Registrar.
Local Government Board.
Royal Commission on Church of England in Wales and Monmouthshire.
Royal Commission on Mines.
Royal Commission on Poor Laws, The Secretary.
Royal Mint.
War Office.
Woods, Forests, &c., Commissioners.

England—

Registrar-General of England.

England—Contd.

London County Council.
„ County Council Education Committee.
London University.
Metropolitan Asylums Board.
„ Water Board.
London. The Corporation of the City.
Battersea Metropolitan Borough, The Town Clerk.
Wandsworth Borough Council.
Birmingham City Treasurer.
Liverpool Mersey Docks and Harbour Board.
Manchester, City Treasurer.
Nottingham, City Accountant.
Paddington Medical Officer of Health.
Poplar Medical Officer of Health.
The Medical Officers of Health of the Local Government Board and of the following towns: Birkenhead, Birmingham, Blackburn, Bradford, Bristol, Cardiff, Derby, Halifax, Huddersfield, Leicester, Liverpool, Manchester, Newcastle-on-Tyne, Norwich, Nottingham, Preston, West Hartlepool Wigan, Wolverhampton.

Ireland—

Department of Agriculture.
Registrar-General of Ireland.

Scotland—

Education Department.
Registrar-General of Scotland.
Edinburgh City Chamberlain.
Aberdeen Medical Officer.
„ Sanitary Inspector.
Glasgow Medical Officer.

During the Year 1910–11—*Contd.*

(d) **Authors, Publishers, &c.**

Alcan, Felix.
Andersson, Dr. Thor.
Arctowski, Henry K.
Bachi, Prof. Riccardo.
Bailliere, Tindall & Cox.
Baines, Sir J. A.
Bamber, Lieut.-Col. C. J.
Bankers Publishing Co.
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Bellom, Maurice.
Berger-Levrault & Co.
Bertillon, Dr. J.
Biach, Dr. Rudolf.
Bisset-Smith, G. T.
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Bohn, M. De Erven F.
Booth, Rt. Hon. Charles, D.C.L.
Boutcher, Mortimore, & Co.
Bowes & Bowes.
Bright, Charles.
Broomhall, G J. S.
Buckley, T. J. W.
Bygate, W.
Callie, J. W. S.
Cambridge University Press.
Cannan, H. W.
Canovai, T.
Capern, E.
Carnegie, Andrew.
Chapelot & Co.
Chapman, Prof. S. J.
Charities Publication Committee.
Clarendon Press.
Coghlan, Hon. T. A., I.S.O.
Colin, Librairie Armand.
Constable, A., & Co.
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Cooper, Joseph.
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Deane, Albert B., F.C.I.S.
Delmar, Alexander.
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Doin & Fils, O.
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Dryden, John F.
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Fisher, Professor Irving.
Flammarion, E.
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Frick, M. Wilhelm.
Frowde, Henry.
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Heron, David, M.A.

During the Year 1910–11—*Contd.*

(d) **Authors, &c.**—*Contd.*

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Jaeckel, Dr. R.
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James, J. A. Barbour.
Johns Hopkins Press.
Jordan & Sons.
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Murray, John.
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Neymarck, A.
Niederlein, Consul Gustav.
Oxford University Press.
Paish, George.
Parry, M. S.
Pearson, Prof. Karl, F.R.S.
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Pfitzner, Johannes.
Phelps, E. B., M.A.
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Provand, A. D.
Pulsford, Edward.
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Puttkammer & Muhlbrecht.
Raffalovich, Arthur.
Rebman, Ltd.
Rew, R. H.
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Ross, A.
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Smith, W. H.
Spon, E. & F. N.
Springerm, Julius Stewart.

During the Year 1910–11—*Contd.*

(d) **Authors, &c.**—*Contd.*

Stevenson, Dr. T. H. C.
Strachan, Richard.
Strachan, W.
Sundbårg, Gustav.
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Thacker, Spink, & Co.
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Wacha, D. E.
Wallis, B. C.
Wallis, Percy.
Walter Scott Publishing Co.
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Webb, A. D., B.Sc.
Webb, H. L.
Webb, M. de P.
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Whitelegge, Sir Arthur B., K.C.B., M.D.
Wille, M.
Williams, F. A.
Williams & Norgate.
Wolfe, S. Herbert.
Wood, G. H.
Yanagisawa, Count.
Yule, G. Udny.
Zahn, Dr. F.

(e) **Societies, &c. (British).**

Accountants and Auditors, Society of.
Actuaries, Institute of.
Anthropological Institute.
Arts, Royal Society of.
Bankers, Institute of.
Birmingham Chamber of Commerce.
Board of Guardians for Relief of Jewish Poor.
Bradford Chamber of Commerce.
British Association.
,, Iron Trade Association.
Cambridge University Press.
Central Association of Accountants.
Charity Organisation Society.
Chartered Accountants, Institute of.
Chemical Society.
Civil Engineers, Institution of.
Corporation of Foreign Bondholders.
Council of the United Synagogue.
East India Association.
Exchange Telegraph Co. Ltd.
Glasgow Royal Philosophical Society.
Howard Association.
Imperial Institute.
Incorporated Accountants' Society.
Iron and Steel Institute.
Liverpool Chamber of Commerce.
London Chamber of Commerce.
,, Library.
,, School of Economics.
,, & Lancashire Fire Insurance Co.
Manchester Statistical Society.
Medical Officers of Health, Incorporated Society of.
Navy League.
Peabody Donation Fund.
Peace Society.
Royal Agricultural Society.
,, Asiatic Society.
,, College of Physicians.
,, ,, Surgeons.
,, Colonial Institute.
,, Economic Society.
,, Geographical Society.
,, Institution of Great Britain.
,, Meteorological Society.
,, Society, Edinburgh.

During the Year 1910-11—*Contd.*

(e) Societies, &c. (British)—*Contd.*

Royal Society, London.
,, United Service Institution.
Sanitary Institute of Great Britain.
Society of Comparative Legislation.
,, of Railway Holders.
,, for Propagation of the Gospel in Foreign Parts.
Sociological Society.
Statistical and Social Inquiry Society of Ireland.
Stock Exchange.
Student's Christian Movement
Surveyors' Institution.
Tariff Commission.
,, Reform League.
United Patternmakers' Association.
United Society of Boilermakers & Iron Shipbuilders.
University College, London.

(f) Periodicals, &c. (British). *The Editors of—*

Accountant, The.
Agricultural Economist.
Associated Accountants Journal.
Athenaeum, The.
Australian World, The.
Bankers' Magazine, The.
Bradshaw's Railway Manual.
Broomhall's Weekly Corn Trade News.
Browne's Export List.
Colliery Guardian, The.
Commercial Intelligence.
Commercial World, The.
Co-partnership.
Economic Review, The.
Economist, The.
Empire Review and Magazine.
Engineering Magazine.
Finance Chronicle, The.
Financial Review of Reviews.
Fireman, The.
Illuminating Engineer.
Insurance Record, The.
Investors' Monthly Manual, The
,, Shilling Year-book.
Joint Stock Companies Journal
Licensing World, The.
Machinery Market, The.
Nature.
Policy-Holder, The
Post Magazine, The.
Public Health.
Sanitary Record, The.
Shipping World, The.
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